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Magazine

How To Look At Automation

Industry vs. the H-Bomb

What About Piggy-Back?

Man-Made Gas Field

Juke Box Symphony

Whither Rapid Transit?

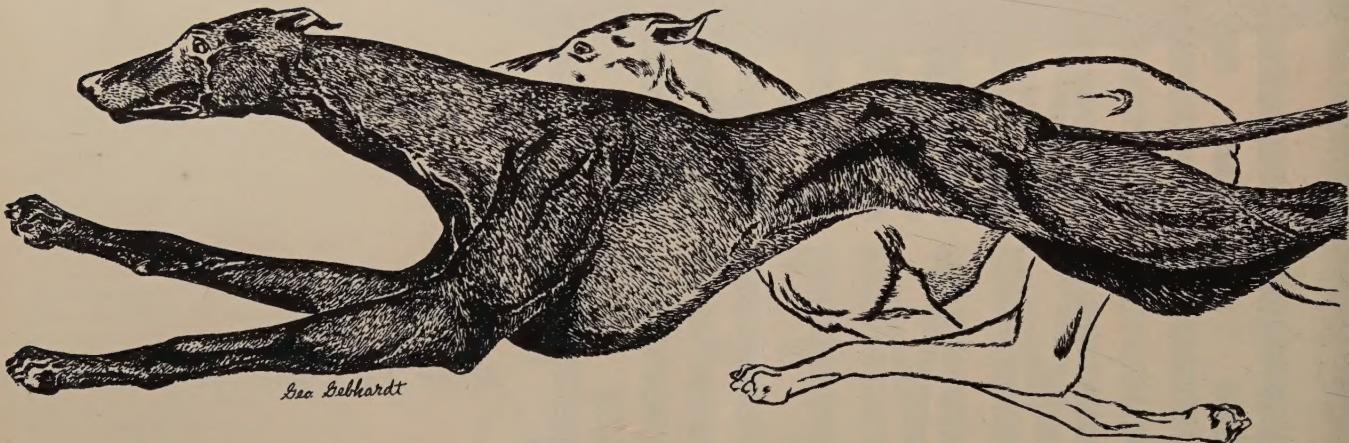
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Note: "The New York Executive" is in addition to the regular 5:05 p.m. nonstop. Eleven other "round the clock" nonstops daily between Chicago and New York.



statistics of...

Chicago Business

	Oct., 1953	Sept., 1953	Oct., 1952
Building permits	888	958	7
Cost	\$ 20,949,400	\$ 16,490,200	\$ 15,326,0
Contracts awarded on building projects,			
Cook Co.	1,657	2,447	1,7
Cost	\$ 44,444,000	\$ 47,834,000	\$ 48,723,0
(F. W. Dodge Corp.)			
Real estate transfers	7,922	7,823	7,8
Consideration	\$ 6,544,899	\$ 4,593,992	\$ 6,363,6
Department store sales index	107.0	104.3	106
(Federal Reserve Board)			
(Daily average 1947-49 = 100)			
Bank clearings	\$ 4,031,915,997	\$ 3,946,419,764	\$ 4,118,234,3
Bank debits to individual accounts:			
7th Federal Reserve District	\$ 23,121,000,000	\$ 22,715,000,000	\$ 22,702,000,0
Chicago only	\$ 11,670,476,000	\$ 11,484,972,000	\$ 11,808,000,0
(Federal Reserve Board)			
Bank loans (outstanding)	\$ 2,800,000,000	\$ 2,901,000,000	\$ 2,683,000,0
Midwest Stock Exchange transactions:			
Number of shares traded	1,088,000	1,131,667	1,119,5
Market value of shares traded	\$ 36,603,242	\$ 36,340,285	\$ 35,826,1
Railway express shipments, Chicago area	1,061,634	957,966	1,193,8
Air express shipments, Chicago area	67,286	63,124	67,5
L.C.L. merchandise cars	20,980	19,597	20,7
Electric power production, kwh	1,360,362,000	1,287,376,000	1,316,933,0
Industrial gas sales, therms	14,188,050	13,137,148	12,545,2
Steel production (net tons)	1,711,800	1,675,600	1,726,7
Revenue passengers carried by Chicago			
Transit Authority lines:			
Surface division	49,583,028	45,788,354	52,560,8
Rapid transit division	12,463,509	11,226,329	12,137,3
Postal receipts	\$ 13,449,090	\$ 12,151,890	\$ 12,638,3
Air passengers:			
Arrivals	309,789	307,676	271,9
Departures	321,782	319,301	282,4
Consumers' Price Index (1947-49 = 100)	117.1	116.6	115
Receipts of salable livestock	473,474	387,795	500,5
Unemployment compensation claimants,			
Cook and DuPage counties	23,786	21,187	22,4
Families on relief rolls:			
Cook County	16,379	16,138	19,0
Other Illinois counties	11,350	11,160	11,3

January, 1954, Tax Calendar

Date Due	Tax	Returnable to
1	Renew city business licenses which expired December 31, 1953	City Collector
15	Final payment of 1953 estimated tax by individuals. Last day for filing amended or first estimate for 1953 (or you may file a final 1953 return and pay the tax due)	Director of Internal Revenue
15	Illinois Retailers' Occupation Tax return and payment for month of December, 1953	Director of Revenue (Ill.)
31	Quarterly return and payment (by depositary receipts or cash) of income taxes withheld by employers for last quarter of 1953 (Form 941); must be accompanied by W-3 (annual reconciliation form); also triplicate copies of Form W-2a (withholding receipts)	Director of Internal Revenue
31	File Employer's Application for Termination of Coverage report, for employers who did not have employment experience in 1953 equal to six or more employees for 20 weeks. (Illinois Form UC-IC). Must be filed prior to February 1, 1954.	Director, Dept. of Labor
31	Employer's Quarterly Tax return for household employees — last quarter of 1953 — return and payment (Form 942). Base \$50 or more in wages and 24 or more days in quarter or preceding quarter	Director of Internal Revenue
31	Illinois Unemployment Compensation contribution and wage report and payment for fourth quarter of 1953 (Forms UC-3 and UC-40)	Director, Dept. of Labor

(Continued on page 47)

COMMERCE

Magazine

**Published since 1904 . . . by the
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December, 1953

Volume 50

Number 11

**in this
issue...**

"Automation" is currently one of the hottest subjects in industry and businessmen can scarcely pick up a trade or business magazine without seeing this very complicated subject discussed. However, the question arises: what should top management know about automation. This month George E. Muschamp, president of the Brown Instruments Division of Minneapolis-Honeywell Regulator Company tells in comparatively simple terms (page 13) just what the subject is all about and what top management's role in automation must be.

• • •

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Nickels By Billions Play Juke Box Symphony	By Grant Ellis	21
Where Is Rapid Transit Going?	By Ralph Budd	23

In this atomic era, much is heard about the problem of protecting American industry against a lightning thrust from an enemy. Already, in fact, several important industry committees have been probing the problem of industry protection in Washington. Correspondent Jack Robins reports (page 15) on several of these important committee findings as they relate to the protection of various strategic, war-supporting industrial fields.

• • •

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American entertainment has never been the same since an obscure inventor, taking his cue from Thomas Edison, came up with the first automatic phonograph machine that has subsequently been called the juke box. Today, a large fascinating industry revolves around the juke box. Grant Ellis explains (page 21) the complicated business operations that proceed behind the juke box that is so familiar to every American.

• • •



Alan Sturdy, Editor • Gordon Rice, Advertising Manager • Gordon Ewen, Associate Editor

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The exciting story of the development of a vast underground repository for natural gas developed by a subsidiary of Peoples Gas Light and Coke Company of Chicago is told this month (page 18) by Joseph Egelhof. The dome, which has been years in development, will play a vital role in bringing more gas to the Chicago area in winter periods of heavy fuel usage for space heating.



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The Editor's Page

Urgently Needed T-H Change

nce the day that the Taft-Hartley law went on the books there has been an almost continuous controversy as to whether it should be killed or amended, and if amended how. One change has been proposed, however, over which there should be no controversy. As the law now stands, management must bargain with the majority union in its plant. Whether the union communist infiltrated makes no difference. Because of this, cases of espionage involving government work have been reported that neither the company management nor the government contracting agency could deal with effectively.

Senator John M. Butler of Maryland has a bill which would correct this fault by removing from the law's protection any unions found to be communist dominated. It is inconceivable that any union except one under communist control could oppose such an amendment. Either Senator Butler's bill or one which would accomplish its purpose should be passed separately. To involve such an urgently needed change in the whole question of amending Taft-Hartley might delay it interminably.

Guaranteed By What?

The Chamber of Commerce of the United States has recently made a study called "The Economics of the Guaranteed Wage." This study would be a valuable contribution to the already extensive literature on the subject at any time. It is exceptionally pertinent now, however, because of the advance word from union leaders indicating that a guaranteed annual wage will be one of their important 1954 objectives. Among the principal conclusions of the study are these:

One, business men have made substantial progress in ironing out seasonal and other short run employment because they realize steady employment helps to maintain labor skills and consumer buying power and reduce costs.

Two, the guaranteed wage idea as a means of accomplishing regularized employment has not been making progress. Government reports issued in 1947 and in 1952 indicate there was no increase in the number of workers covered by such plans during that period.

Three, business executives who have adopted private guaranteed wage plans stress that the guarantee is the result of natural stability and prior regulation policies and programs — not the cause.

The George A. Hormel Company, which was an early leader in adopting an annual wage program, has summed the principle up as follows: "Certainly our Company is wholly unable to redeem the money consideration in such a guarantee unless we can keep our people actually and profitably employed. The entire asset value of our Company, leaving everything we own, would only be sufficient to redeem a ten months guarantee. If we as a Com-

pany cannot make such a guarantee, neither can our community, for we know that in our town all of the bank assets including county deposits, city deposits, all the money owned by all of us, would only cover the payroll for nine months. So, when using the phrase 'guaranteed annual wage,' we must ask the question — guaranteed by what? The only guarantee we know of is the ability of management to manage, coupled with willingness of workers to work. If either fails, then the guarantee fails."

In other words, labor-management groups could negotiate and sign contracts guaranteeing wages of any amount for any period of time. But the contract would not be worth the paper it is written on unless the company could sell enough goods at a profitable price to make its fulfillment possible.

We're Glad To Know—

One might think that the Commerce Clearing House, which reports nationally on changes in tax and business law, might find its work dry. This is not the case, however, according to a summary it has prepared of "unusual and zany proposals" acted upon by state legislatures in 1953.

For instance, it's now illegal to tattoo a minor in Connecticut. A wife-beating husband is no longer subject to a penalty of 40 lashes in Maryland, and it's against the law to dance in the dark in North Dakota. Delaware limited fox hunting on Sundays, but declared it lawful to kill a fox on any day if it was in pursuit of poultry.

Maryland eliminated special penalties for killing a man in a duel, stealing buoys from Chesapeake Bay, or attending a meeting to promote secession from the Union.

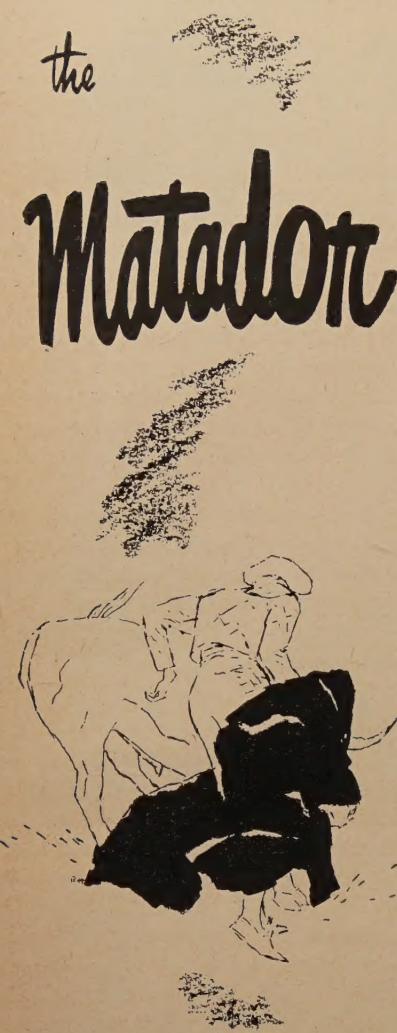
This state also repealed a law providing a 25 cent fine for the first profanity uttered in the presence of a justice of the peace or a sheriff, and a 50 cent fine for any subsequent violation.

An Arkansas legislator asked an annual tax of \$750 on bachelors. His proposal was referred to the Committee on Conservation of Natural Resources.

Massachusetts no longer requires an employer to furnish spittoons. North Dakota considered a measure to close beauty shops at 5:45 o'clock every evening, and authorized the proprietor to "use all reasonable force necessary to eject customers, whether or not any beauty treatment then in process was completed." California considered making it illegal for a cat to hide in city vacant lots if songbirds frequent them.

One Tennessee legislator, who might have been trying to find reasons for all the foregoing, introduced a bill to repeal every law on the books in that state.

Alan Sturdy



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Here...There... and Everywhere

• **Eligible Spinsters** — The ladies have it! There were 1,682 unmarried women who reported incomes of more than \$100,000 in 1950, according to Commerce Clearing House's analysis of recent Treasury Department statistics. This represented a comfortable lead over the 1,358 total of single men in the \$100,000-plus class. A woman was among the three single persons who had incomes of over \$5 million. She reported an adjusted gross income of \$6,413,000 and paid a tax of \$4,309,000. In the \$1 million to \$5 million class the honors were equal with 26 of each sex qualifying. But feminine ascendancy was apparent from \$100,000 to \$1 million with the count 1,655 women against 1,330 men.

• **Auto Forecast** — A doubling of the number of motor vehicles in use by 1975 is predicted by Raymond R. Rausch, executive vice president of Willys Motors, Inc. "In view of the birthrate curve and the normal turnover or replacement of cars, I would say that today's total of 50,500,000 vehicles in use will be increased to 60,000,000 by 1960, and to 100,000,000 by 1975." Mr. Rausch says the "saturated market" is a myth in terms of long-range auto production.

• **Working Diamonds** — Three tons of diamonds valued at \$50 million imported by the United States this year will bypass jewelry counters and end up being used in factories for drilling, grinding and polishing jobs. C. R. Myer, manager of the abrasives division of Elgin National Watch Company, reports that diamond imports for industrial use have risen from 4,500,000 carats in 1946 to almost 14,000,000 this year. He attributes the rising use of diamond tools and abrasives to a greater demand for more accurate tools and dies in metal-working industries and to the resurgence of oil prospecting. Manufacturers, he reports, gladly

pay the difference between \$5,000 pound for diamonds and 16 cents pound for the best substitute. Diamonds, four times harder than any other known substance, are invaluable in finishing and polishing the new super-hard tungsten carbide tools and dies.

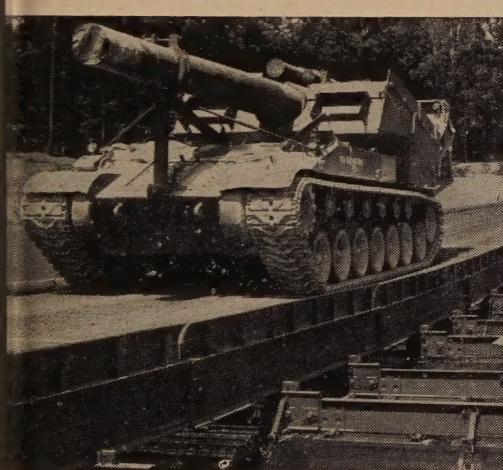
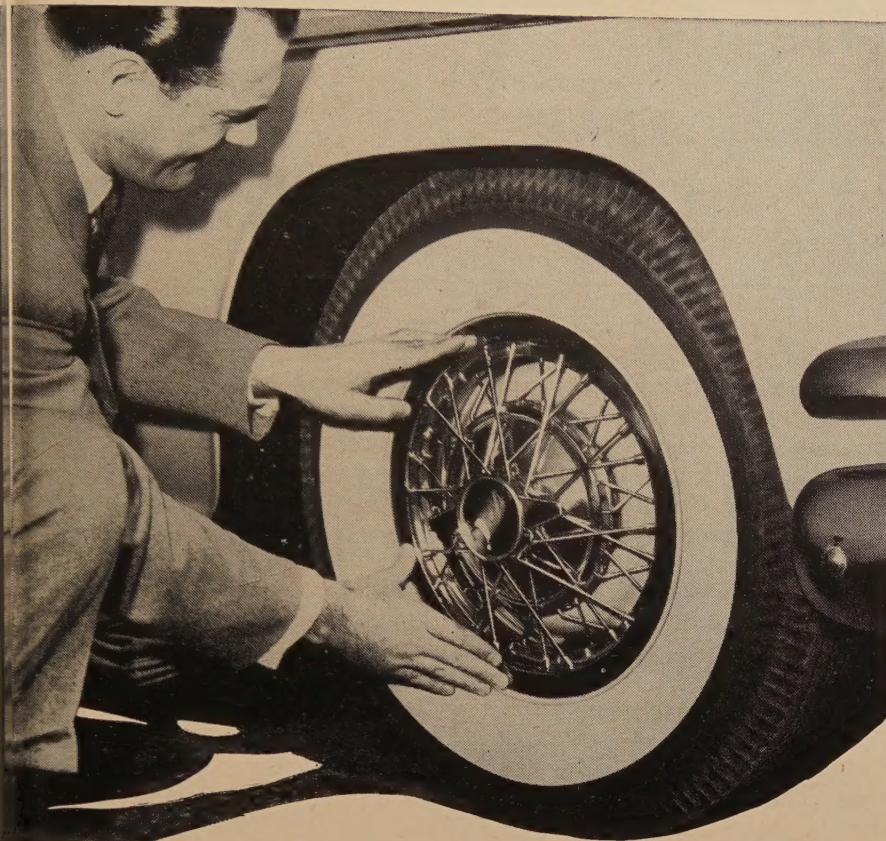
• **Costly Loss** — With 1953 looming as the worst fire year in history and losses expected to exceed \$1 billion, John A. Arnold, vice president of American Manufacturers Insurance Company of Chicago, points out that amount of money thus lost would build modern schools in 7,500 communities or 500 fully equipped hospitals.

• **Winter Jet Center** — Adverse weather conditions in Minneapolis during the winter months are cited by the Aeronautical Division of Minneapolis-Honeywell Regulatory Company as the reason for the establishment of a wintertime jet aircraft flight center at Tucson, Ariz. Honeywell is expanding its production of electronic pilots and other automatic control equipment for fighters and bombers and wants to insure uninterrupted flight operations. For aircraft other than jet, winter flight operations will continue at Minneapolis.

• **Self-Contained X-Rays** — Small self-contained sources of x-rays soon may be a commercial reality with uses in both industry and medicine, reports the Armour Research Foundation of Illinois Institute of Technology. The foundation is working to develop a "pocket-size" radiation source invented by Dr. Leon Reiffel, supervisor of its nuclear physics section. The new x-ray source can be made in almost any size, from tiny pellets to large blocks or sheets. With this new discovery, Dr. Reiffel says, industry would not have to

(Continued on page 45)

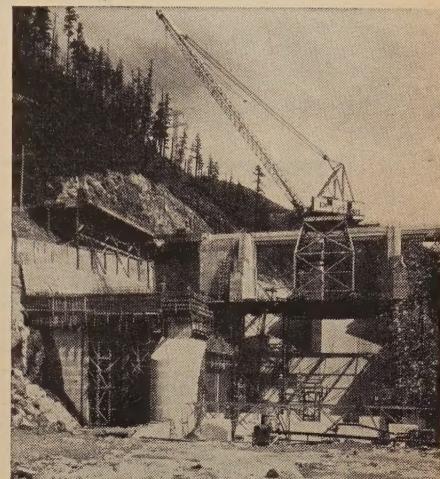
Only STEEL can do so many jobs so well



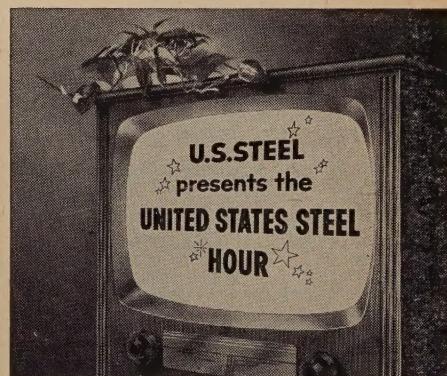
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Wider, Stronger Bridges that can be erected quickly are needed by the Army today — because of larger, heavier mechanized equipment and the necessity for rapid movement. Here's one of the new Division Floating Bridges undergoing a gruelling load test . . . bearing the enormous weight of a motor gun carriage. Many of these Army bridges are floored with U.S.S. I-Beam-Lok Steel Flooring.

Back-stage . . . at a Restaurant. Here you see what's behind the scenes at one of the finest of Los Angeles restaurants. And what's behind the scenes is U.S.S. Stainless Steel . . . sparkling, easy-to-keep-spotless stainless steel kitchen equipment that helps to guard food flavors, helps to assure maximum cleanliness, helps to make every kitchen task easier and more sanitary.



Big Cliff Dam in Oregon, like most modern dams, is arresting evidence of the truth that only steel can do so many jobs so well. For steel plays a vital part in all phases of construction and operation: from steel cranes to enormous penstocks; from huge steel gates to countless steel reinforcing bars buried in the concrete. Big Cliff Dam is 180 feet high from foundation to deck, 295 feet long.



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Trends . . . in Finance and Business



• **Housing Outlook**—Prefaced by the statement that no sharp general business decline is in prospect, the committee on trends and economic research of the United States Savings and Loan League has predicted a national volume of between 900,000 and 950,000 new housing starts in 1954. This would be a decline of between 10 and 15 per cent from 1953.

The committee's report makes these observations:

"There is good reason to believe that, partly as a result of pressure to meet urgent demands and partly as a result of government policies which favored low-cost homes, a great many houses built since the war have been too small—certainly too small in view of the recent rise in average family size.

"The next year may well witness both a shift toward larger houses and a substantial volume of alterations and improvements."

A survey of the savings association managers confirms that sales of new houses are a little slower than they were at this time last year.

"This is especially true of higher priced houses; 72 per cent of the reports show sales to be lower," the survey states. "The volume of sales of used houses is definitely lower than a year ago, especially houses over ten years old."

Home prices are also reported lower with only low-priced new houses tending to resist the decline.

Comes also an optimistic prediction from Charles L. Clements, president of the Savings and Loan League, and Norman Strunk, its executive vice president, that families planning to buy or build homes next year will find the prospects for home credit more favorable than in 1953.

The pair says that because the

federal government has softened its hard-money policy in recent months, a greater supply of mortgage money is assured.

The advantages to prospective home buyers are these, they say:

For veterans, GI loans will be easier to obtain in many areas than they have been this year.

The non-veteran will find more lending institutions competing for his business and in some cases will be able to obtain a loan with a slightly lower interest rate than in 1953.

• **How Good Are Stocks?**—Commenting on the results of a recent stock market study by the University of Michigan, a leading broker has this to say:

"In 40 years on Wall Street, I have known many strong boosters of common stocks, but frankly I never knew anyone who would have dared to claim that stocks were intrinsically as good investments as the Michigan study proves them to be."

The broker is Winthrop H. Smith, active head of Merrill Lynch, Pierpont Fenner and Beane, and his comments were published in an article he wrote for *Exchange*, the publication of the New York Stock Exchange.

The Michigan study demonstrated that \$1,000 invested in 92 common stocks on Jan. 15 of each year from 1937 through 1950, or a total of \$1,288,000, plus reinvestment of dividends, would have produced a Jan. 15, 1950, portfolio of \$3,028,855.

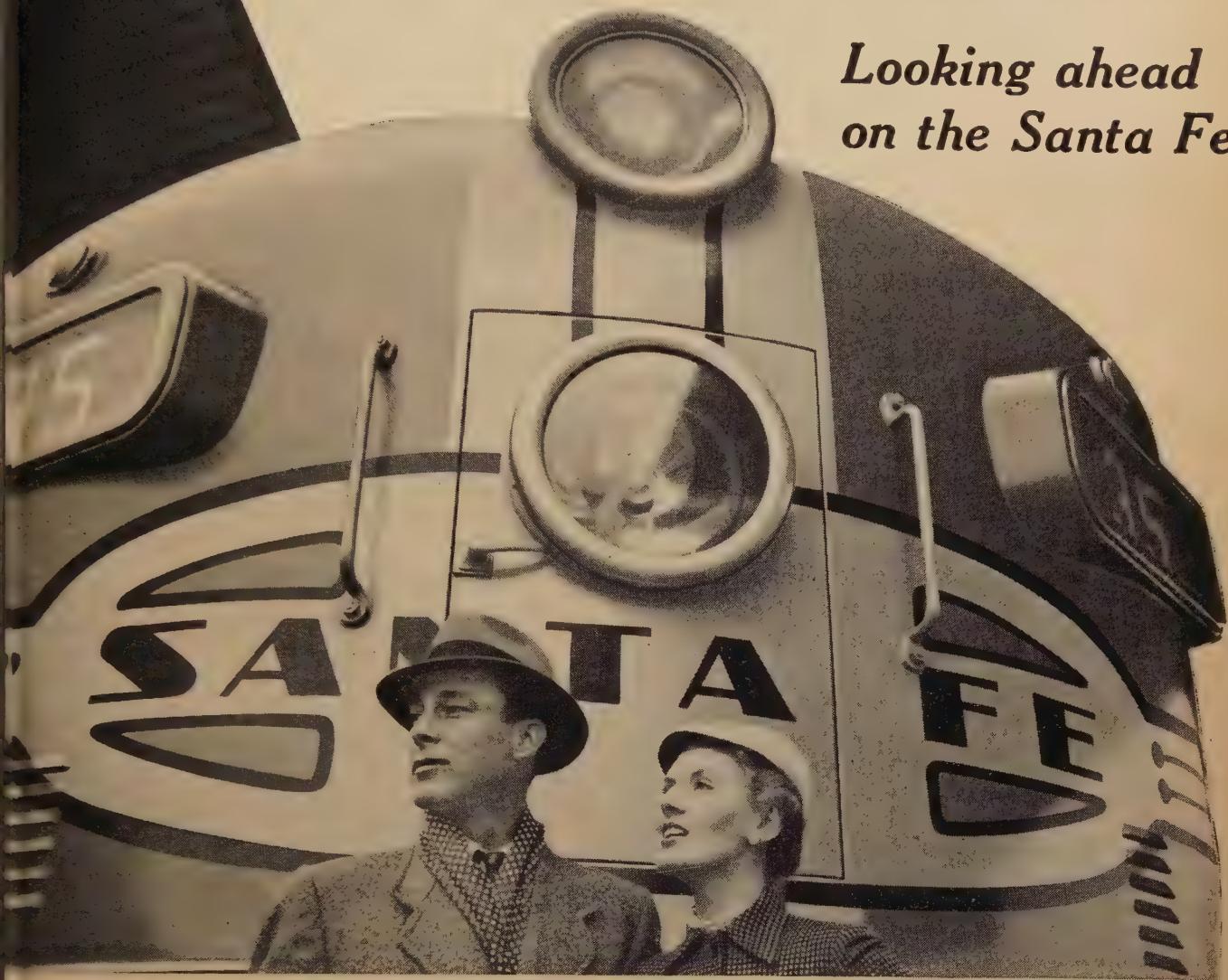
The return was the equivalent of 12.2 per cent compound interest.

What lends authority to the study is the fact that Professors Wilford Eiteman and Frank P. Smith made an impartial selection of stocks, taking into account every issue—good, bad and indifferent—that has

(Continued on page 32)

America's New Railroad

*Looking ahead
on the Santa Fe*



You've been reading a lot this year about things that make and keep the Santa Fe "America's New Railroad."

New cars, new locomotives, new yards, new tracks, new communication methods, new streamliners and new freight services.

So it goes, day-after-day, on the Santa Fe—this building new. For only by constantly building and rebuilding can a railroad stay new and ready for the future. So it will be in '54 and in the years ahead—with important new projects like these now under way:

NEW CHIEF TO SAN FRANCISCO . . . In early '54 a whole new streamlined train—the *San Francisco Chief*—from Chicago to the Golden Gate in 47½ hours, via the San Joaquin Valley through the colorful Southwest Indian Country.

NEW RAILROAD TO DALLAS . . . 48.5 miles of it. Now being planned to provide direct mainline service to shorten time and mileage for passengers and freight between Dallas and Chicago and points in Oklahoma, Kansas and the Midwest.

NEW IMPROVEMENTS ALL ALONG THE LINE . . . Little things, big things—all things that are important to

the people who ship and ride on "America's New Railroad."

The millions of dollars this newness costs Santa Fe doesn't cost *you* a single penny in the taxes you pay.

* * * *

All these things help to provide better service for Santa Fe patrons. They inspire Santa Fe people—the men and women whose thoughts, ideas and physical efforts are what make the operation of "America's New Railroad" possible.

But their feeling for their railroad goes much deeper. It's a combination of things—a great respect for tradition, mixed with equal respect for the daring it has taken to break with tradition. It's a sharing of the "let's-do-it-better" spirit that keeps the Santa Fe growing *newer* every day.

**PROGRESS THAT
PAYS ITS OWN WAY**





The Way To Look At Automation

By GEORGE M. MUSCHAMP

**Without going overboard on expense, business
can organize to explore the possibilities**

Automation is perhaps the most widely discussed subject in industry today. The subject is vast and complex, and one that involves many phases of engineering. But the question arises: what should top business managers know about this complicated subject? In the accompanying article, one authority answers that question, indicating among other things that business managers can scarcely be expected to know the mathematics and the mechanics of automation—but they must, nevertheless, be prepared to "start the ball rolling" before anything can be accomplished. The author is vice president in charge of engineering of the Brown Instruments division of Minneapolis-Honeywell Regulator Company.

gone. Special dough mixtures are extruded under pressure by precision mechanisms, which drop them into a container of grease under automatic temperature control, equipped with automatic conveying means and with automatic means for flipping them over. And that, in a word, is this wonderful word "automation" that industry is talking about today!

Pulling Curtain Aside

From the manager's standpoint, I want to try to pull aside the curtain that to some extent has been drawn across the "automatic factory" concept. This is actually a result of the discussion of oversophisticated means of carrying out low cost manufacture plus the undue emphasis upon the means of reaching the end of low cost, and the slighting of the end itself. It is easy to fall into this trap. Quite candidly, I am not so sure that in the intervening 25 years since my doughnut-machine days, I have always kept my eye upon the doughnut and not upon the hole. It is very easy to become fascinated with the possibilities of a marvelous computer, an analytical instrument, a clever conveyor belt, or a multi-purpose automatic machine—to the disregard of overall economics.

If you approach automation from a truly system engineering standpoint

— which means approaching it from the top down — you have the most elementary approach imaginable. From the manager's standpoint, this reduction to the simplest yet the most significant form, is the end we seek. This does not mean that in the stages of development of the system engineering of an automatic factory, there will not be involved the engineering, scientific, financial and other business considerations of great complexity. It's just that we eliminate them from our initial top level consideration.

The mechanical and electronic means of carrying out automatic factory concepts are not primarily a manager's job, so I'll not dwell upon them. There is an extensive documentation of the art and complete bibliographies are available. It is more important to know how management may get at the utility of these wonders and determine where and to what extent they may be utilized.

The technical literature, the popular press, and science fiction are full of detailed examples of automation. The mathematical treatments found in the new management techniques are equally difficult for the average executive. One can wade through a thesis of some 10 to 15 pages, including involved mathematics only to

MY first acquaintance with automation was in 1927 in connection with the automatic making of doughnuts. In those days, a big vat of grease, a pot full of dough, a stick, and some willing Salvation Army lassies made up a respectable doughnut operation. Today, both the stick and the lassie are

Automatic controls and recording devices have helped to boost the chemical plant worker's annual output from \$15,000 in 1939 to \$27,000 today.

find that all it says is something that novice production-planning clerks learn in the first few hours. That is not to disparage the mathematical attempts but to make the point that it is rather optimistic to expect industrial executives today to review their algebra, calculus and still more advanced mathematics in the course of their busy lives. They should know, however, where they can find or direct their subordinates to find sufficient information about them to enable them to use them in their organizations.

Actuaries Make Study

A good illustration is the recent report of the "committee on new recording means and computing devices" of the Society of Actuaries. This committee, over a period of four years, has studied the means available to them today to minimize the human operations of large life insurance companies, particularly examining computers or data-handling

equipment. The committee was considering specifically the application in the insurance business of various "mechanical brains"—electronic computers, punched card data reduction and storing machines and the like.

The committee concluded that actuarial investigations would not justify the expense of this equipment because that work was of an infrequent and specialized nature and would require a disproportionate amount of set-up expense. It concluded in connection with policy settlement work, that because the total volume of work was so small and such a wide variety of operations were involved, this area did not represent a good field for increased economy. They examined in detail the problem of file keeping and, for this use, the mechanical means under consideration were rejected because of its inflexibility for making changes and getting access to its information.

So much for the negative side. On the positive side, however, the com-

mittee concluded that mechanical means were suitable for regular policy servicing, that suitable equipment for these functions is now available, that equipment could be utilized with substantial reduction in operation costs, and that it would not result in serious dislocations of their personnel. To be effective, it would require no replacement of their existing insurance specialists with engineering specialists, but that they had somehow to get an understanding by their people of the capacity of these very complex machines.

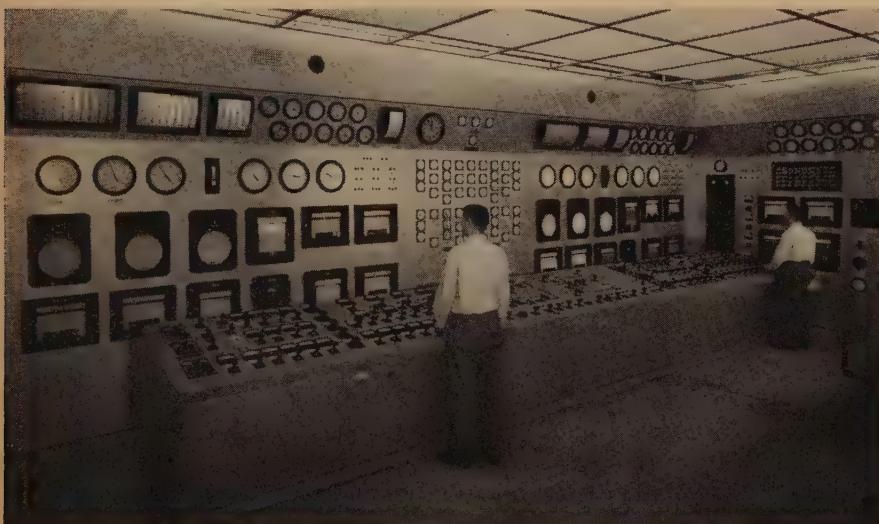
Top Decision Necessary

There are, I believe, several points of importance to management in this extensive study. First, and of greatest importance, the launching of this committee was preceded by a management type decision to do something, to recognize the possibilities of a new approach, and take the actions required to investigate the possibilities. This is not something which could be launched from a subordinate position. It had to have a decision to do it.

Furthermore, the project required a thorough understanding of the capabilities of the new techniques by those who were trying to apply them. This, I am sure, involved much study on the part of the insurance men to learn how these complex systems work and what they could do. The point is simply this: if you are not willing to pay the price of such exploration, you are probably not going to have automation!

This valuable project did not re-

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ABOVE—Public utilities have met the demands for more power by expansion and modernization. They are big users of automatic indicating and control instruments.

RIGHT—The human hand is being replaced in the textile industry by controls that keep an accurate and inexpensive watch over varied operations.



Industry vs. The H-Bomb

U. S. survival depends on industry's ability to recover after the first blow; here is how some companies are getting prepared

By JACK ROBINS

ONE thing about modern warfare: its weapons are getting bigger and bigger. One of the arguments that went on in the government before the U.S. began development of the hydrogen bomb was that it brought weapons to the point of diminishing returns. The H-bomb was so powerful, the argument ran, that in theory it would "overkill" at the center of the explosion—i.e., waste a lot of that tremendous excess power. Some of the scientists argued that you could get greater devastation, at less cost, from 10 plutonium bombs than from one hydrogen bomb.

For better or worse, that argument was decided; the U.S. went ahead with development of the H-bomb. Now that Russia has achieved the same frightening secret, official Washington believes our decision was for the better. We got the jump on Russia with the weapon, though we knew we would never be the first to use it.

As a civilized nation, we have ruled out the possibility of making a sneak atomic attack on an enemy, even though we do not regard him as similarly honor-bound. If atomic war comes, we have already determined to take the first blow, and count first on our atomic retaliatory power and second on the recovery

and lasting power of our economy to win in the long run.

But, under these conditions, the H-bomb in Russia's hands raises a new problem for American industry. It is tailor-made for the kind of target concentrations we have in the U. S.

70 Prime Targets

Some time ago civil defense officials released the information that the U. S. has 70 prime target areas. This calculation was based chiefly on population concentrations. The same analysis based on industrial concentration shows even more startling figures:

In the nation's first 20 metropolitan areas is concentrated 56 per cent of industrial production by dollar value.

In the first 31 metropolitan areas the concentration is 66 per cent.

In 50 metropolitan areas the concentration is 71 per cent, includes 54 per cent of the workers, with a dollar value output of \$63.9 billion a year.

Fifty big targets are what the Air Force describes as a "managable" number of targets. The U. S. zeroed in on a lot more than that in Germany during the last war.

When you look at the types of production needed for defense, the statistics are equally bleak. Ten leading U. S. cities, with 40 per cent of productive capacity, account for 50 per cent of electrical machinery production, 51 per cent of transportation machines, 48 per cent of instruments, and so on, down to 55 per cent of machinery other than electrical.

What is the answer? Dispersal of industry is the obvious one, but dispersal is a difficult, costly, and lengthy process. Although it may be the long range answer, there are things that industry can do now.

Washington's Office of Defense Mobilization, in cooperation with the Commerce Department's Business and Defense Services Administration, is now in the process of finding out what these steps are, in a study of what it calls "post attack production measures." In this case it is interesting to note that Washington is asking industry to think about the answers, not undertaking to tell industry what it must do.

This program is being actively promoted, even though peace of sorts has come in Korea, because our policy makers believe (1) future world war is impossible without

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BURYING THE HATCHET BY PIGGY BACK?

By R. W. BARROW

Railroads and truck lines show signs of forgetting their bitter feud for traffic to join forces in reviving old plan to carry highway trailers part way on flat cars

IF you can't lick 'em, join 'em!" This bit of old time philosophy, it appears, is carrying over into modern times as one of the giants of American industry — the railroads — shows signs of joining up with an arch-rival — the nation's truck lines — in ending a bitter 20-year struggle for traffic in which the truck lines appear to have gotten the edge.

This burying of the hatchet — to come about through "piggy-back" transportation in which the railroads would haul loaded highway freight trailers in large volume — would not only tend to boost the revenues and profits of both transportation agencies, but would provide far-reaching gains for the public as well.

The movement of loaded highway

trailers on railroad flat cars is nothing new. The Chicago, North Shore and Milwaukee Railroad pioneered "piggy-back" operations 27 years ago when it began hauling its own less-than-carload shipments in specially-designed highway trailers on flat cars. Six years later, the railroad altered its service so that it could carry conventional over-the-road semi-trailers on flat cars. The railroad hauled as many as 40 trailers loaded with freight daily on a 94-mile haul to and from Chicago, before discontinuing the service in April, 1947. Since the North Shore Line inaugurated such service 27 years ago, other railroads have experimented with the movement — and some like the New York, New

Haven and Hartford are now hauling trailers on flat cars successfully.

The newest thing about trailer-on-flat-car service is the growing feeling among many "progressives" in the railroad and trucking industry and in transportation generally that "piggy-back" movement offers the best solution to many problems plaguing both forms of transportation. As a result of this feeling, various large railroads are reviving or launching for the first time trailer-on-flat car service, several large railroad equipment manufacturers are developing special equipment to be used in such service, and various organizations such as the Brotherhood of Railroad Trainmen who have a big stake in the railroads

industry's future, have gone on record supporting the new service on a large scale, while groups like the American Association of Railroad Superintendents are devoting much time and study to the subject.

Combines Advantages

What is modern "piggy-back" service?

This method of transportation combines the inherent advantages of each form of transportation involved: the railroads' ability to haul huge volumes of goods more cheaply over long distances and the truck lines' ability to provide uninterrupted delivery of goods from shippers' docks to consignees' doors. Railroads now providing the service use special flat cars carrying one 32-foot highway trailer with a 25- to

30-ton load capacity, or two smaller trailers. The trailers, which contain less-carload shipments, or small shipments of a miscellaneous nature, are loaded by special ramps.

Larger flat cars, capable of hauling more and bigger trailers, are in the offing. The Electro-Motive division of General Motors Corporation has introduced flat cars of 75 feet in length, capable of carrying two 35-foot highway trailers. The car is of all-welded construction, and features a depressed center section, only 29 inches from the rails, through which runs a raised portion for improving car strength and preventing side movement of trailers. When it is realized that a train of 50 such cars could haul more than 2,500 tons of freight, the magnitude of "piggy-back" operations is apparent.

The Electro-Motive division has just displayed its new car, along with a special adaptation of a standard hydraulic lift truck to be used in moving loaded highway trailers on and off railroad flat cars, and scale models and plans for special terminals to be used in providing trailer-on-flat car service.

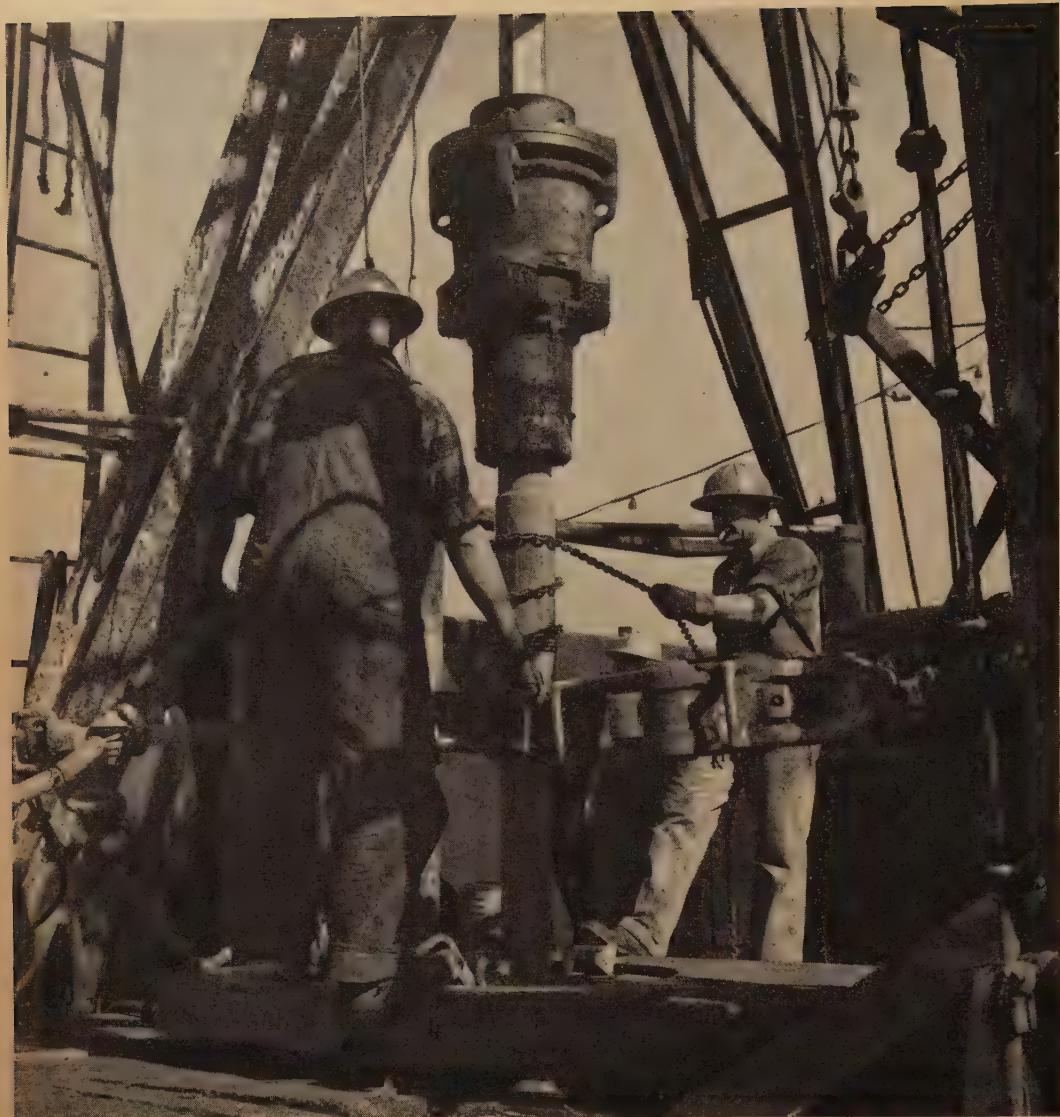
Doubling Potential

According to N. C. Dezendorf, G. M. vice-president and general manager of the Electro-Motive division, the development of a flat car capable of hauling two standard-size highway trailers, doubled the revenue possibilities of "piggy-back" service, and provided the railroads with an opportunity to develop a revenue-producing service potential.

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"Piggy-back" operations are gaining momentum. At right, a specially adapted lift truck finishes job of setting standard highway semi-trailer on new General Motors flat car. Below left, a New Haven "Trailiner" train, loaded with highway trailers shipped by motor carriers, leaves Boston. Below right, Chicago & North Western employees buckle down trailers with simple fastening devices.





Workmen here are drilling one of the 1,750-foot injection wells at the Herscher dome project near Kankakee.

MAN-MADE GAS FIELD

Underground detective work was called for when water wells started to bubble gas on farms near Peoples Gas' huge storage project

by JOE EGELHOF

A HALF billion years ago nature began building an enormous potential gas reservoir about 55 miles from the present location of Chicago. A thick bed of soft, porous sandstone was deposited in the Cambrian period, when seas covered a large part of the continent. On top of this layer, known as the Galesville sand to geologists, were piled other formations — shale, limestone, and

more sandstone. The Galesville was literally sandwiched between two layers of gas-tight shale and dolomite.

The reservoir took shape when the formations were arched by the earth's incalculable pressures into a vast underground dome. This happened in the vicinity of what is now the village of Herscher in western Kankakee county.

Had other factors been favorable the Galesville layer of the dome might well have become a trap for petroleum or natural gas. But the eons weren't as kind to Herscher as they were to Texas. Salty water instead of mineral wealth, flooded the domed sandstone stratum.

So it remained for a time inconceivable to the human mind, which the world took shape as we know

and man spread himself and his works over the globe. It was one of these works—a small and rather commonplace object, perhaps, by comparison with nature's grand achievements—that finally changed the Herscher dome. This device was the gas furnace, spectacular merchandising success of recent years.

Because tens of thousands of Chicagoans have stood in line for gas heating, the old dome has become a man-made gas field. The ancient water in the Galesville sand has been pushed laterally by a bubble of gas brought 1,400 miles from Texas and injected through wells at high pressure.

Some \$17 million have been spent on the gigantic storage project. The cost may rise to \$45 million before Herscher is working at capacity, taking in 90 billion cubic feet of gas in the warm months and ejecting it in winter. Beneath the prairie landscape, altered by the fantastic "Christmas tree" shapes of injection wells, there now lies about 8 billion cubic feet of gas, an enormous quantity though only a fraction of the ultimate amount to be stored within the great geological trap.

If plans work out, the big dome will be the largest "aquifer" storage field in the United States. The country has only four of these fields—so called because in the natural state their storage strata were filled with water. It will be one of the wonders of Chicago industry, and, like all great engineering achievements, the product of vast study and ingenuity.

Chicagoans Wanted Gas

The Herscher story began several years ago when Chicago families, spurred by factors of cost, cleanliness, and ease of operation, began signing up for gas heating. They went on a waiting list—not for the appliances but for the authority to install them, so they could use gas fuel.

Peoples Gas Light and Coke Company, a utility serving the Chicago area, faced a tough problem. The dilemma posed by the clamoring customers was that space heating is a seasonal proposition. It builds up to a peak on wintry days, but is light in the temperate months and nonexistent in sultry weather. How could a big new winter demand be served without huge additions to pipeline

capacity which would be uneconomical in summer?

So the utility came to the conclusion several years ago that what it needed was storage space for gas coming from the southwest to serve its customers. That seems like an obvious solution, but it was not simple. Why not build it? Well, a holder of the required capacity of 90 billion cubic feet of gas would have to be 4,974 feet high and 4,800 feet in diameter, the utility has calculated. It would be as big as 9,000 ordinary gas storage tanks or holders, as they are known in the industry.

Methods Explored

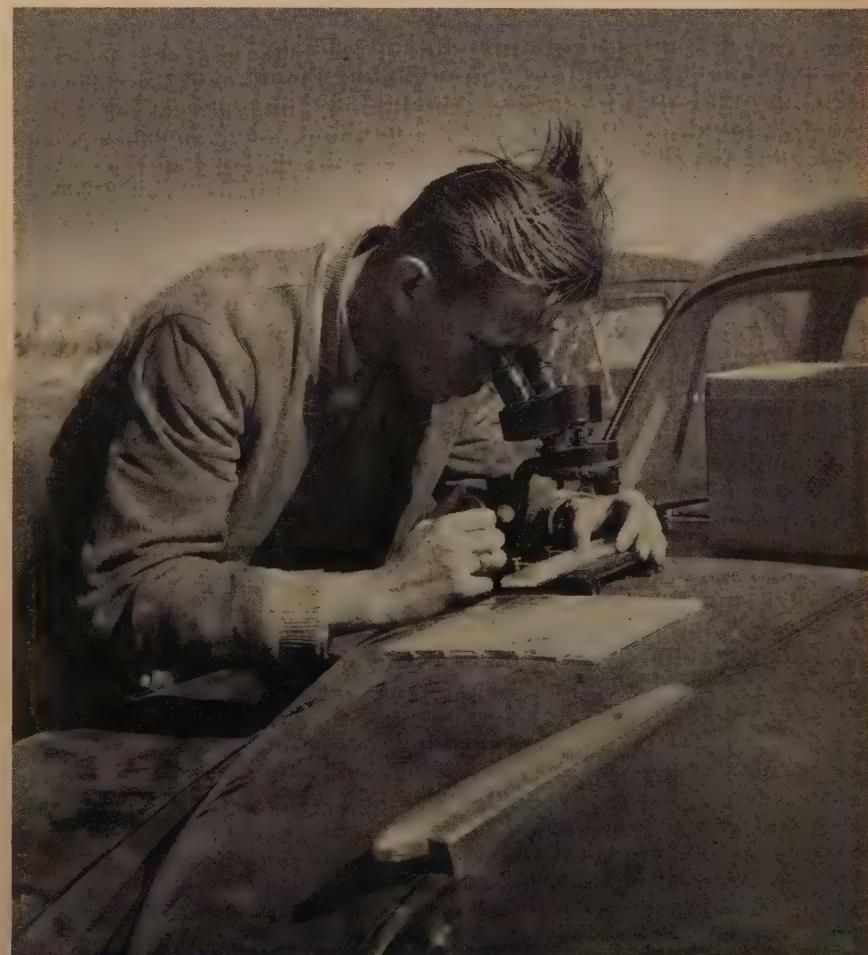
Underground storage thus became the only practical answer to the space heating question. There were three possible methods. One was mining limestone out of a deep bed, marketing the stone as the cavern was developed. This was rejected as slow and costly. The second, used on a wide scale by industry, was the injection of gas into exhausted or par-

tially depleted gas or oil fields. This idea was turned down primarily because the usable fields in Illinois were so far from Chicago that transmission would be too expensive, and in addition, because their capacity was limited.

The third possibility was in developing one of the few big geologic domes in this part of the country. In this way attention turned to the old might-have-been gas field, the Herscher "anticline." Geologists had known something about the dome for years, the first data having been collected and published in 1928 by the Illinois State Geological Survey.

Studies began in early 1947, but the project was delayed until late 1949. Then plans were put in final shape for the construction of the huge Texas-Illinois pipeline which now carries gas from fields along the Gulf coast north to serve Peoples and other utilities.

A glance at the map put Herscher far ahead of other domes being considered. The field lay just 17 miles



A geologist examines core samples taken from the Herscher dome project.

east of the route of the Texas-Illinois line, which terminates at Joliet just 44 miles to the north.

But questions popped in the minds of experts working on the idea. They knew the arch was there underground and that a bed of sandstone lay at a depth of 1,700 feet or more. But was the sandstone a real gas trap?

Tests Started

Available data showed a bed of Galena dolomite at depths ranging from 150 to 500 feet and that the contour of this stone followed that of the Galesville sand. So the dolomite was used as a "marker" formation for tests. Seismic readings were made in a 30 square mile area. In this type of exploration dynamite blasts are set off. Their shock waves race through the earth and rebound, with varying velocities, to detectors on the surface which make a film record for the purpose of determining the type and depth of rock strata. The work required 100 seismographic stations.

This wasn't enough. Water well drilling equipment was used to bore 104 test holes to the dolomite. From these tests the experts determined that there was indeed a natural trap

of almost 25 square miles in area, shaped like a huge meat platter turned upside down. The vitally important "closure" of the trap was about 200 feet, more than enough to keep the gas from straying.

Next, the Galesville itself was plumbed with five test wells sunk to depths of 2,000 feet. The drilling cores taken were studied for their porosity and permeability.

With the tests completed, the utility company and its pipeline subsidiaries were convinced that the Herscher storage field could be successfully developed. The Galesville was found to be a high silica sand, resembling the clean, light colored sand that children like to play in. The porosity — percentage of the rock represented by pore spaces — averaged about 25 per cent, above the average for oil and gas fields. The permeability rating — measuring the ease with which fluids can move — was the highest of any storage field for which data were available.

The normal pressure of the water in the reservoir was found to be about 700 pounds per square inch. This was an important test. The experts figured that it would be possible to inject the gas at a pressure of less than 1,000 pounds per square

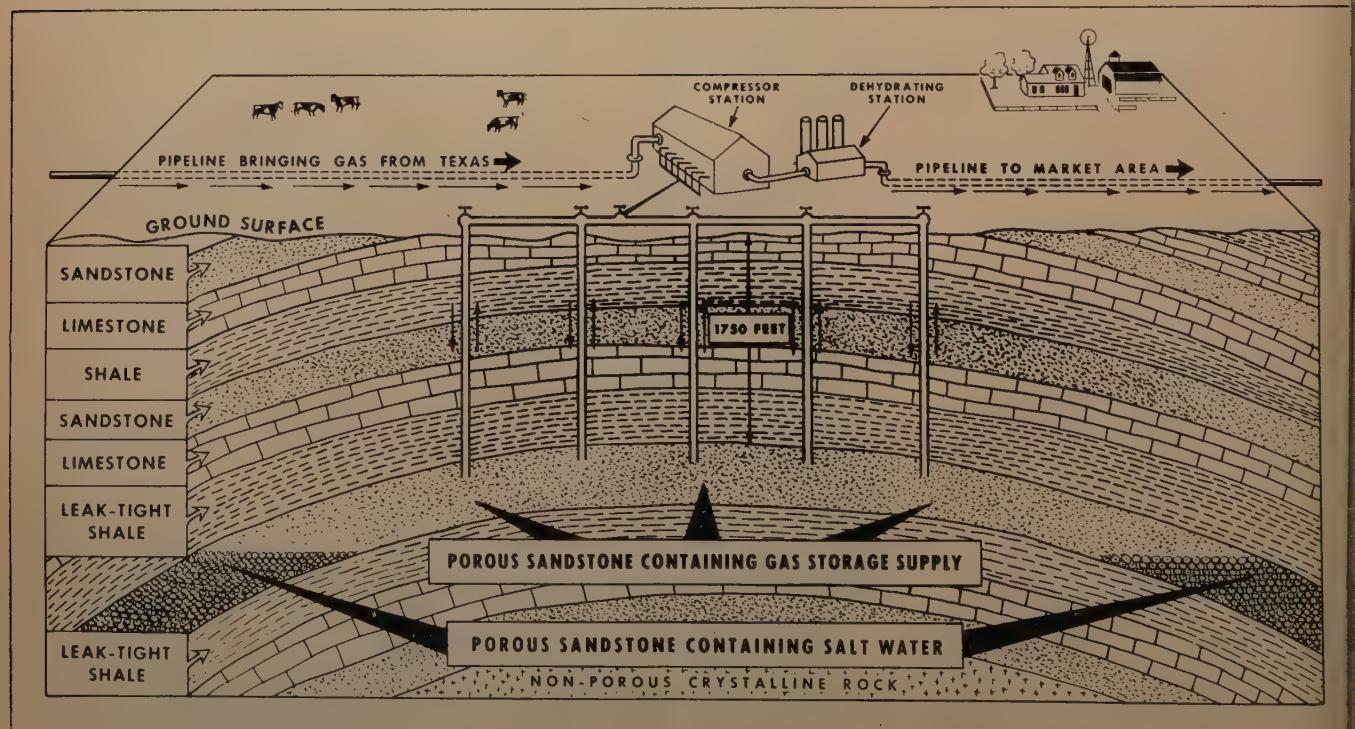
inch. The gas then would force the water back toward the perimeter of the arched reservoir with the heavier water remaining along side at a lower level in the sandstone, forming a seal to keep the gas from escaping from its trap.

The problem of how much cushion gas would be required also was explored. The experts decided that to keep water from reentering certain parts of the reservoir and to maintain a steady pressure for 90 billion cubic feet of annual input and output, something less than an equal amount of gas would have to be invested permanently below the surface at a cost of millions of dollars. What the exact ratio will be has not been exactly determined as yet.

Approval Obtained

After the Peoples management gave its approval to the plans, the utility set about to make it legally possible. Approval of the Federal Power Commission and the Illinois Commerce Commission was obtained. In early 1951 the Illinois state legislature passed a bill granting the right of eminent domain to enable the utility to purchase storage rights under the Herscher farm

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Sketch shows geological features and installations at the Herscher dome underground gas storage field. Natural gas will flow from the Texas-Illinois long-distance pipeline to compressor station for injection into the sandstone stratum deep underground by means of 24 injector wells. Gas drawn from storage zone in coldest weather will pass through dehydration plant and through dust scrubbers before being transmitted to utility companies.



Spring driven paddle wheel mechanism on a Multiphone juke box in service around 1900.

NICKELS BY BILLIONS PLAY JUKE BOX SYMPHONY

By GRANT ELLIS

OUR 450,000 JUKES COMPRIZE A 1/2 BILLION DOLLAR INDUSTRY

THIS winter a new kind of dog team will be mushing through the snows of Labrador and Iceland. Instead of mink or silver fox pelts, this sled will carry bags full of coins, phonograph records and spare juke box parts. The man cracking the whip will not be a swarthy Indian trapper; he will be a juke box operator. Like thousands of others engaged in this little-known business, he will be servicing a string of jukeboxes, emptying coin boxes and inserting records calculated to please the public's musical tastes.

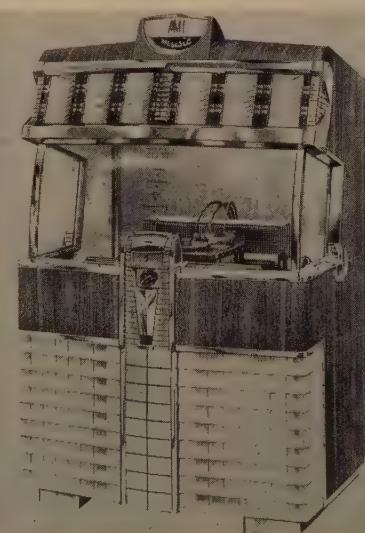
Some 7,500 businessmen are carrying on similar operations throughout the United States and in many foreign countries. In the U. S. alone, where most of the world's jukeboxes are concentrated, 450,000 machines are maintained for the pleasure of millions. Ranging from old-time clunkers reminiscent of the pianola days to sleek modern devices holding 120 selections, the jukeboxes provide music for every taste—classical, popular ("pop" to the trade), hillbilly and polka. Since the war, the booming industry has added 100,000 new jukeboxes.

Last year millions of nickels,

dimes and quarters poured into U. S. juke boxes. Operators (known as "ops") used the money to buy new machines (\$800 to \$1200 each) to defray service costs and to buy phonograph records. In 1952, jukebox operators bought 60 million discs (average price: 50c), which amounts to 20 per cent of the record industry's total output for the year! The average operator buys

165 records each week, according to a survey conducted by *Billboard*, the trade weekly of the amusement business. Some operators handle eight or ten boxes as a sideline; others, the entrepreneurs of juke-dom, own hundreds of machines and employ service men to handle the various routes.

The same survey found that an average "op" handles 77 boxes



Left: This 1953 high fidelity model by AMI, Inc. plays 120 selections. Right: Multiphone which offered 24 selections.



— Multiphone photos: *Billboard Publishing Company*

which yield him an average weekly gross of \$10.43 each. Part of the proceeds go to the owner of the restaurant, snack shop or tavern where the juke is located. In many instances, the operator takes the first \$5, then splits the remainder with the location owner. A fairly standard arrangement is an even 50-50 split between the "op" and the location owner.

Claims have been made that some locations gross as much as \$100 a week per juke. A location that would return as much as \$60 to \$75 weekly justifies an operator in putting in the big new 120-play \$1,200 equipment. From that level locations grade down to where they may return \$7 or \$8 a week and only justify an ancient box. Incidentally, successful operators must have bal-

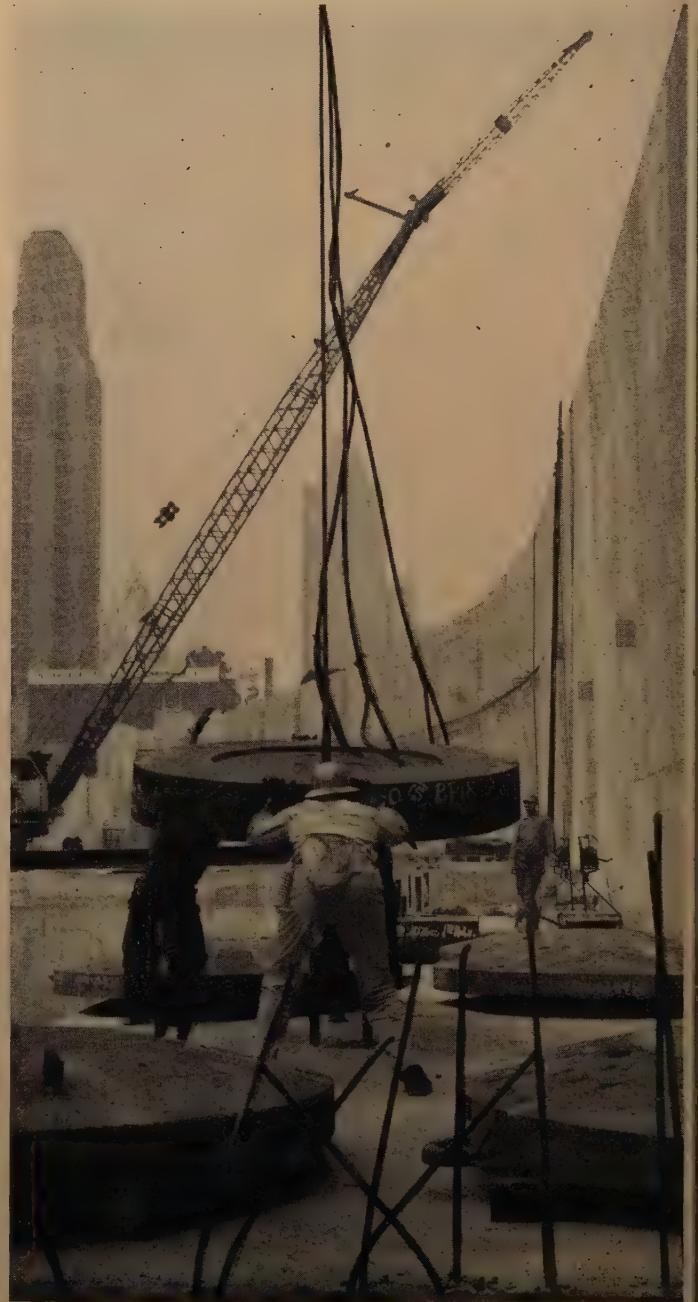
ance in their inventory of machines ranging from new high priced equipment down to boxes about ready for the junk heap. As a result, there is a lively second-hand market for machines.

One question often asked juke box operators is why location owners do not operate their own boxes and thus avoid the middleman. The

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STEEL "FEET" FOR A SKYSCRAPER!

Huge discs of steel that will support the columns of the 41-story Prudential Insurance Company building, now under construction in downtown Chicago, are seen here being lowered within reach of American Bridge Division workmen who guide them into place — the first steel in the erection of a skyscraper. The discs, or — more technically speaking — base plates, descend from a crane located at Randolph Street and Michigan Avenue, the site of the city's newest skyscraper that will rise over the Illinois Central Railroad tracks. American Bridge, a division of the United States Steel Corporation, will fabricate and erect the steel framework. It is estimated that some 31,000 tons of structural steel will be used in the lake-front building which, according to current forecasts, will be ready for occupancy sometime in 1955.



Where Is Rapid Transit Going?

**Plans for 'traffic free' routes
dovetail with superhighway projects**

By RALPH BUDD

Since its formation in 1947 the Chicago Transit Authority has invested close to \$90 million in modernizing its facilities. In an address before the Chicago Association of Commerce and Industry, Ralph Budd, who became CTA chairman after a distinguished career in railroading, summarized the authority's past progress and outlined its plan for extending "traffic free" rapid transit in the metropolitan area. The following condensation of his talk makes worthwhile reading for anyone interested in Chicago's future.

THE easiest and quickest way to approach an answer to the question — "Where Is Rapid Transit Going?" — is to tell what the Chicago Transit Authority has done and is doing to modernize our surface system. There are two reasons for starting with the surface system — first, it is the major part of our operations; and, second, financing can be arranged easier for the purchase of surface facilities.

At the beginning of this year, CTA had purchased and received delivery of 2,611 modern surface vehicles — motor buses, trolley buses and streetcars. For delivery this year and early in 1954, CTA has bought 400 more odorless propane buses. With the delivery of these units, and with the modern buses acquired through the recent purchase of the

Chicago Motor Coach Company, modernization of the surface system will be 80 per cent complete.

CTA has been a pioneer in the large-scale use of propane buses. By mid-year 1954 we will be operating 951 units. This is by far the largest fleet of propane buses in operation anywhere.

Public reaction to these buses has been gratifyingly favorable. There is every indication, too, that they are economical to operate and maintain. In our service-at-cost operation, this is important.

The substitution of modern buses for streetcars has moved forward rapidly. Of the 52 streetcar routes being operated on Oct. 1, 1947, when CTA acquired the surface lines, only ten remain. All but two or three of these are to be converted to bus operation within the next year or two.

Red Streetcar Vanishing

The old red streetcar is vanishing. It's on the way to the scrap heap. In two years, perhaps three, it will be only a memory. Its noisy clatter has already been stilled on nearly 1,200 miles of routes.

Other important benefits have come from the change-over from rail to rubber, and from the flexibility of operation that is inherent in free-wheeling transit vehicles. Establishment of one-way streets to relieve traffic congestion has been

hastened and made easier, and the job of the city, the county and the state in resurfacing and repaving streets has been simplified. These agencies have resurfaced or repaved 215 miles of streets where streetcars formerly operated.

Modernization of rapid transit equipment began with the purchase of 130 latest type all-metal cars for the Dearborn Street-Milwaukee avenue subway in 1951. Later this order was increased to 200 cars, all of which are now in service.

Converted Green Hornets

Now CTA is purchasing another 250 all-metal units for the high-speed rapid transit facility which is being built in the median strip of the Congress Street Expressway, and which is soon to replace the Garfield Park elevated structure.

The 250 new rapid transit cars will actually be converted "Green Hornet" streetcars. Within a month or six weeks, the first of these re-fabricated cars — equivalent in every respect to cars built with all new components — will be delivered and placed in service. By mid-summer, we hope to have the entire 250 in use.

This "Green Hornet" rapid transit car is the result of pioneering by CTA. Preliminary to the start of rapid transit equipment modernization, four experimental cars were built to our design and order, but

these units cost in excess of \$100,000 each, a sum too costly for our service-at-cost operation.

It was then that the idea was developed for adapting the "Green Hornet" streetcar design to a rapid transit car for the subways and the elevated. Car manufacturers were consulted and agreed the idea was practical. So the first "Green Hornet" rapid transit cars were ordered—at a unit cost much less than the experimental cars, as well as considerably less than the unit cost of cars built for subway and elevated operations in other cities.

The next step occurred when CTA decided to fabricate new rapid transit cars from "Green Hornet" streetcars that were being replaced on the streets by buses. Here, too, a substantial saving is being achieved at no sacrifice of quality or performance. This saving amounts to about \$20,000 per unit, or a total saving of \$5,000,000 on the 250 new cars.

Much development work is being done towards future rapid transit rolling stock. The Authority is working actively with such organizations as the Transit Research Corporation, General Electric Company, Westinghouse Electric Corporation, St. Louis Car Company, Clark Equipment Company, General Steel Castings, and American Steel Foundries to produce an "L"-subway car that will have riding qualities comparable to the best railroad coach, and with motors and control equipment capable of a speed of 78 m.p.h.

Service Modernized

Moving in step with the equipment modernization program is the modernization of service. Unification of Chicago's major local transit services—a fifty-year objective—has been achieved through the purchase of the Chicago Motor Coach Company. The three systems are now integrated and co-ordinated with a liberal, universal free transfer to encourage the interchange of passengers.

In surface operations, a degree of flexibility has been attained that never could have been reached when streetcars dominated the fleet. Buses are much more maneuverable than streetcars on today's traffic-jammed streets.

The number of off-the-street surface terminals has been more than doubled since 1945, thereby contrib-

uting to the safer, smoother flow of street traffic. At the street level entrances of many rapid transit stations convenient bus-rapid transit passenger transfer points have been established. A program of constructing off-the-street, under shelter transfer facilities between surface and rapid transit routes at heavily patronized rapid transit terminals is underway.

Parking Lot Plan

Underway also is a program of establishing parking lots at strategic terminals where motorists may transfer to and from rapid transit to avoid the delays and hazards that attend driving in congested areas. Consideration is also being given to experimental installation of an escalator in the Loop, operating between street level and the "L" platform.

On the rapid transit system, where there is relatively little interference from street traffic, the improvement in service has been especially marked. The former practice of intermingling local and express trains has been discontinued. Lightly used stations have been closed, and alternate stop express service is provided on the major rapid transit routes during the hours of heaviest travel.

Passenger traffic volume on the rapid transit system is steadily increasing, although the system is still not paying its way. The increase is counter to the trend of rider volume on CTA's surface routes, and the trend generally reported by other local transit operations.

We are convinced that street traffic congestion can be effectively reduced by bringing about a greater use of rapid transit facilities.

Traffic congestion is of major concern to CTA and to its 1,800,000 average weekday riders on the surface routes. Delays are particularly severe in the central business district where the rush-hour speed of cars and buses frequently is as low as four miles per hour.

Consequently a good part of the advantages of flexible, fast, modern surface equipment is completely offset, for a portion of each weekday, by traffic delays beyond control of CTA. We are, however, co-operating with all public and civic agencies in efforts to expedite the flow of traffic. Some progress has been made, but the situation is still very critical.

Cordon traffic counts, taken yearly on a typical day in May in the central business district, prove conclusively that the worst offender is the automobile. In the 1953 count approximately 8,000 surface transit vehicles—buses and streetcars—brought 207,000 people into the central business district, while 147,777 automobiles (more than 18 times the number of buses and streetcars) carried only 221,500 people.

Now we come to the sixty-four dollar question: "Where Is Rapid Transit Going?"

Here in Chicago, we are establishing a pattern for future extensions of rapid transit.

I refer specifically to the high-speed rapid transit facility being built for CTA operation in the median strip of the Congress Street Expressway all the way from the central business district to Des Plaines Avenue, Forest Park, a distance of ten miles. In this instance, the grade separated rapid transit facility is replacing the Garfield Park elevated structure. Here the public highway agencies—the city, the county, the state and the federal governments—are providing a grade-separated right-of-way at no direct cost to local transit riders.

Will Be Superlative

With modern, all-metal cars being assigned to the route and operated in the below-street grade right-of-way, a superlative rapid transit service will be provided.

A new terminal will be constructed to accommodate and encourage passenger transfer interchange with the Chicago, Aurora and Elgin interurban railroad, with CTA feeder buses, and with suburban buses serving adjacent territory. The terminal will include a parking lot for motorists.

Through service will be provided between Des Plaines Avenue, Forest Park, and Logan Square, in Chicago, by way of the median strip of the expressway, the Milwaukee Avenue subway, and the Logan Square elevated structure.

Engineers estimate that the median strip rapid transit facility will have a capacity of 30,000 persons per hour compared with 9,000 persons per hour traveling in the same direction by automobile on the expressway's four lanes.

For maximum efficiency, a subway

(Continued on page 31)

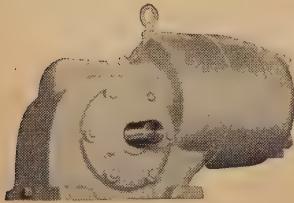
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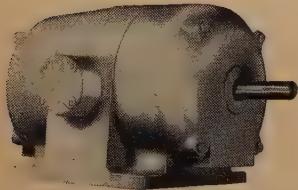
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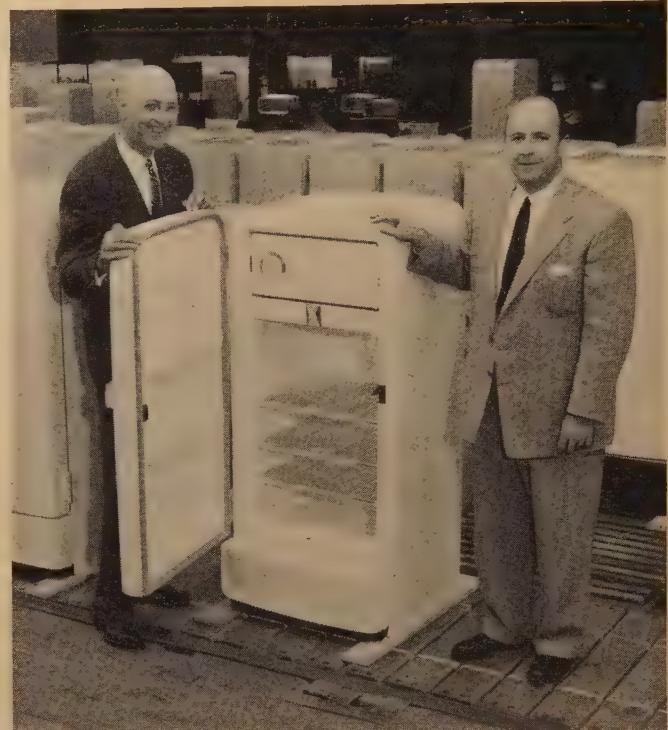
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New Hotpoint Production

Chicago's industrial community has been expanded by the addition of its first plant for the manufacture of household refrigerators. The plant, which was especially designed for refrigerator production by the Hotpoint Company, manufacturer of major appliances for electric kitchens and home laundries, was completed shortly after the start of the Korean war. Upon completion, it was immediately diverted to jet engine production. Termination of that work recently freed it for its original purpose.

Shown above is John C. Sharp (left), president of the company and John F. McDaniel, vice president marketing, with the first seven cubic foot refrigerator to be manufactured in the facility. Capacity is 400,000 refrigerators a year or one every 40 seconds. About 1,500 employees will staff the plant.

Juke Box Symphony

(Continued from page 22)

question is easily answered. The operator also services the juke boxes which are only slightly less complicated than an electronic calculator. In addition, he stocks a tremendous number of records (many used seasonally), and he keeps tabs on record preferences of the public. This is more than the average location owner would like to add to his daily duties. "Ops" get their machines from distributors, who, in turn, buy direct from the major manufacturing companies: AMI,

Incorporated; H. C. Evans and Company; Rock-Ola Manufacturing Company; J. P. Seeburg Corp.; and the Rudolph Wurlitzer Company.

This, briefly, is the business structure that operates behind the blare of lights and music that the public sees and hears. Actually, the juke box is one element of a triple team which makes up the popular music business today. The first element is the record producers—the artists and the record companies. Second on the pop music team is the di-

ockey, modern-day phenomenon known to teen-agers, hep cats and one trade as "dee jays," "jockeys" or "platter pushers." Then comes the juke box operator. How these three work together is a study in fast footwork, shrewd knowledge of mass tastes and high-pressure promotion.

It begins with the record producer. He assembles what he thinks to be a winning team: a melody, lyrics and the artists to play and sing it. When the record has been made, sample copies are rushed to the all-important disk jockeys. Depending upon whether the tune "has it" or not, the jockeys play it and plug it, thereby creating the initial popularity. At this point the 450,000 juke boxes take over. By giving the public a chance to play an upcoming hit, juke boxes turn the groundswell of popularity into a coast-to-coast tidal wave.

Juke box operators are always alert to pick up indications of the next groundswell that may mean a new record will be a hit. Weekly popularity polls are watched closely by the "ops." Ads and special publicity also herald the release of new records, which come pouring onto the market at the rate of 150 to 200 a week. The juke box operator must wade through the welter of perquisites and pick the "comers" for his boxes. In this respect, the "op" is in somewhat the same position as a trout fisherman pondering which kind of artificial fly to use. If the "op" guesses wrong, his receipts dwindle. If he's right, the public endorses his judgment with a current of nickels, dimes and quarters.

The juke operator has to make fast decisions, for the public taste in popular music is extremely fickle. A tune may zoom to popularity, then fade as quickly into obscurity. For example, the smash hit tune "Dragnet" sold 600,000 copies during its first two weeks on the market.

It was played again and again by every jockey in the country, and juke box operators who had moved fast reaped a golden harvest. Those who hesitated missed the peak of popularity. For them the record was only a fraction as profitable as it might have been.

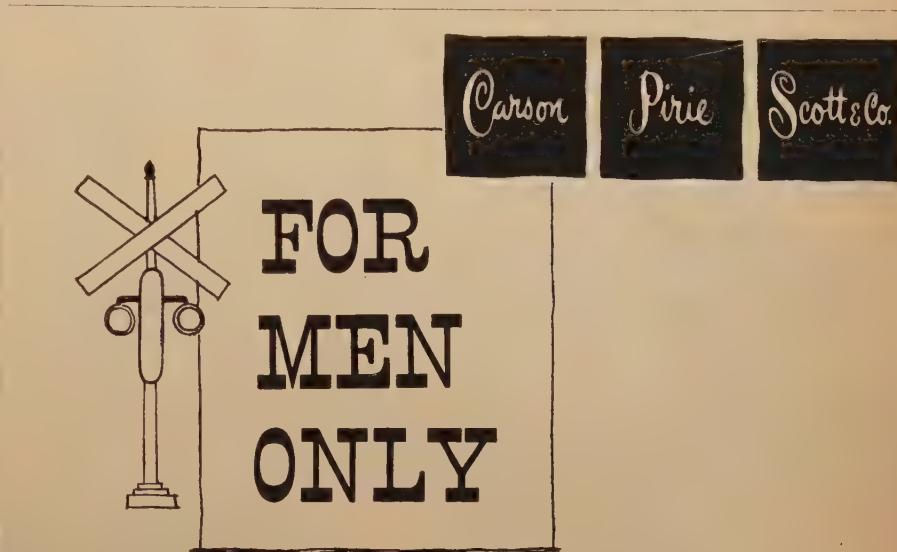
The "op" must also consider the special tastes of the patrons who feed nickels into his boxes. A machine on Division Street in Chicago

offers polkas and folk tunes which have special appeal to people of Polish extraction living in the area. A juke in a soda shop hangout for teen-agers contains mostly pop records. And a machine in a restaurant carries a wide selection, including a few Bing Crosby standbys and perhaps a symphonic record or two.

Oddly enough, there seems to be relatively little sustained, industry-wide cooperation between all those who have a financial stake in juke-dom. "The thing most lacking in all parts of the industry is the right

kind of public relations," declares George A. Miller, president of the Music Operators of America. "Until the general public is fully acquainted with the juke box industry, we will always be faced with certain types of legislation and unnecessary resistance."

One public relations problem faced by the industry is the need to remove the taint of tawdriness remaining in the public mind from the time when certain juke box operations — principally in big cities — were controlled by strong-arm

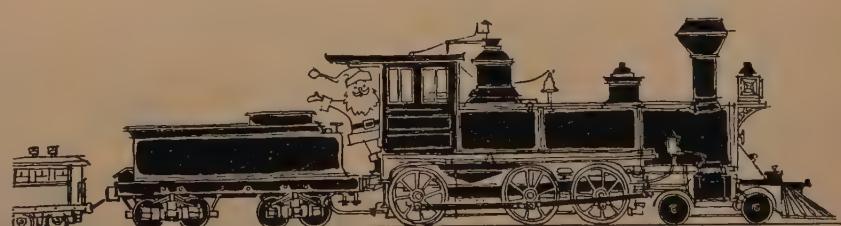


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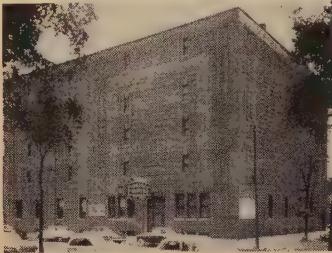
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racketeers who forced merchants to take syndicate-owned jukeboxes. Only a tiny percentage of the industry is troubled with this problem nowadays, though an unsavory situation in Detroit recently troubled the waters again. As an offset, the industry points to more and more machines going into church recreation centers, "off-the-street" clubs, etc.

Aside from dispelling the notion that jukeboxes are operated by the hoods, every element of the industry is at present vitally concerned over two bills now pending in Congress. These laws, if passed, would make juke box operators liable for copyright royalty payments on each record played. They contend they already pay "royalties" in the price they pay for records. The industry has united to fight the proposal. Opposing the new legislation are certain record manufacturers, the Music Operators of America, California Tavern Association and many other trade associations whose members have a dollars and cents stake in the outcome. Pushing as vigorously in the opposite direction are the

American Society of Composers, Authors and Publishers; Broadcast Music, Inc.; Authors League America; Songwriters' Protective Association and the American Booksellers' Council, Inc.

As is the custom in such fracas, loud screams of injustice are being uttered by both partners in the controversy. Regardless of the outcome, however, the juke box industry seems to be in a pretty solid position. As each year passes, it is becoming more desirable business from the standpoint of operators and manufacturers. Evidence of this is the fact that many banks which used to frown upon loans to buy juke box equipment now consider juke parts highly desirable.

One reason for optimism — particularly on the part of manufacturers — is the huge foreign market which looms invitingly overseas. Music is a much more vital part of the lives of people in some foreign nations, and so the juke fits in these nations as neatly as a needle into a phonograph groove.

During 1952, an estimated 10,000

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Merchandising Fair

Hiram Walker, Inc., recognizing the stepped up competition in all lines, adapted the idea of a fair to its program to strengthen dealer merchandising. Sixty firms displayed equipment and products at the two-day fair in the LaSalle Hotel which drew 8,000 retailers from the Chicago area.

ikes valued at over \$4 million were shipped to foreign countries. Venezuela, with imports totaling \$100,108, was the prime customer. Next came Canada with \$58,801. Juke exports were up 22 per cent for the first half of this year, according to U. S. Department of Commerce. Further indication of the juke box's international appeal is the fact that major manufacturers sell distributors in such faroff and unlikely places as Curacao, South Africa, Okinawa, Uruguay and the Phillipine Islands.

Another interesting development in jukedom has been the growth in multiple units — those setups with one central phonograph connected to coin boxes throughout the restaurant or tavern. This arrangement enables patrons to choose their music without getting up from the booth or table. The arrangement is equally convenient for the juke operators because two or more people will often order a popular tune at the same time. Each person puts a nickel in the slot and when the tune plays, each customer is satisfied. Thus the operators collect two or more coins for just one play!

"Red Nickel"

Another gimmick not generally known by the public is the "red nickel." Many operators give bartenders or restaurant cashiers a supply of coins painted red. These are used by the management to keep the juke going in between plays paid for by the customers. (Receipts tend to slack off after periods of silence.) Then, when the operator comes around to empty the coins, he simply refunds the "red nickels," which are used over again.

Such refinements were probably beyond the notions of Louis Glass, the first juke box operator, who launched the industry 65 years ago. Glass had seen the possibilities of a coin-operated phonograph soon after Thomas Edison had perfected his invention in 1888. Glass lost no time in building a machine which had four separate listening tubes, each controlled by a coin.

This wondrous device was first displayed in the San Francisco Palais Royal Saloon on November 23, 1889. Glass thoughtfully provided small towels so the ear phones could be wiped off after each customer had gotten his money's worth

of such current favorites as "I Love My Wife But Oh! You Kid" and "Will You Love Me in December as You Did in May?" In six months Glass's mechanical wonder had taken in more than 20,000 nickels and the juke box had demonstrated its earning power. By 1891 Glass had 14 similar machines spotted about Frisco.

From these quaint beginnings, the juke box industry grew steadily. As the country's population increased and the market expanded, more and more manufacturers got into the business. Competing for the operator's dollar, they introduced an end-

less parade of innovations ranging from speakers (which eliminated the earphones) to multicolored lights and long-playing records. The chief improvement, however, has been the manufacturers' ceaseless urge to increase the number of records in each machine. Early machines played just two or three tunes. The lastest ultra-modern machines today offer the customer 120 different songs, and even high fidelity. Currently manufacturers are striving to make the juke box less gaudy so that it will not look out of place in more sedate surroundings.

During the first two decades of the



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century, the juke's great rival was the nickelodian, which nearly killed the infant juke business. As movies became more popular, the old-time amusement arcades folded and this development forced juke box operators to search for new locations. So the jukes invaded saloons and dance halls, where nickelodians were grinding out popular melodies.

Jukes and player pianos were still battling it out when radio appeared on the scene and tipped the scales in favor of the coin-operated phonographs. For radio killed off the player piano and, at the same time, gave the juke box electric amplification, which broadened its popularity tremendously. Then, in 1928, the first fully automatic juke box was introduced by AMI, Inc., and the modern era dawned.

The most recent threat to the jukes has been TV, which at first scared the "ops" as much as it frightened Hollywood. When TV's great boom began in 1947, thousands and

thousands of taverns installed television sets. Enthralled by the novelty of TV, patrons turned their backs on the familiar jukes to watch the miraculous flickering screen. Juke "ops" receipts dropped disastrously and prophets of gloom were busily measuring the industry for a coffin when an amazing thing happened. The public suddenly tired of TV. Having their fill of the novelty, they returned to the fold, as if in answer to the operators' fervent prayers.

As TV goes into new areas, the same story is repeated over and over again: First the jukes are eclipsed, then they snap back into public favor.

Industry spokesmen claim this one reason why the juke box has bested the nickelodian and other competitors as the principal purveyor of public music: The juke gives the customer a wide selection of music. The customer is the boss when he puts his nickel into the slot.

Today the juke box is a hallmark of the American scene. It is adopted and enjoyed by all age groups, for whose musical tastes it exerts a kind of benign domination. Businesswise, the juke box empire stretches all the way from the plush recording studios of Manhattan to the neighborhood saloon on Main Street, where nickels clank and the whirling, bubbling lights shine far into the night.

Rapid Transit

(Continued from page 24)

A turn-around should be built west of the loop so that trains during hours of peak travel may be turned back to their respective terminals. It is required because the potential traffic volumes of the two legs of the consolidated route are not evenly balanced.

When the median strip rapid transit facility is ready, there is no reason why two sides of the elevated loop in the downtown area cannot be removed. Chicago will never completely modernize its local transit until it gets rid of the downtown elevated structures.

The Congress Street expressway is only one of the superhighways included in the city's plan for the construction of superhighways. At least two proposed routes offer possibilities for rapid transit operations, either rail or bus.

One is the proposed North Superhighway, for which the elevated right-of-way between Howard Street, Chicago, and Linden Avenue, Wilmette, might be adapted. From near Linden Avenue on north through the suburbs adjacent to Wilmette, the superhighway perhaps could be located in the depressed right-of-way of the present North Shore interurban line.

A second possibility is the proposed South Superhighway which would extend south from the Congress Expressway to 35th Street, then to a right-of-way near State Street, and then south to near 99th Street and State Street, where, it is proposed, a connection would be built between the South Expressway and the projected Indiana cross-state expressway into Chicago.

The proposed Northwest Superhighway seems also to offer possibility for rapid transit operations inasmuch as only a short link would be

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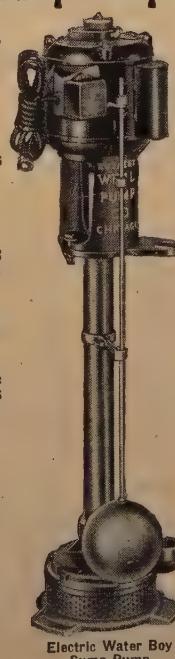
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The Congress Street expressway plan is the ideal solution of the problem of transporting people in congested areas of large metropolitan centers. Much more can be accomplished with a given expenditure by providing for mass transit along with automobiles than to spend all of the monies for the construction of expressways, street widenings, and parking facilities for automobiles.

Trends In Finance and Business

(Continued from page 11)

traded over 1,000,000 shares in 1936. Also the Dow-Jones industrial average on Jan. 15, 1950, was just about the same as it had been on Jan. 15, 1937. The period studied was long enough to be valid, and the 92 stocks represented 27 different industries.

The educators also selected the best performing stock in each industry — 27 in all — and invested \$1,000 a year in each. By Jan. 15, 1950, the \$378,000 so invested had, with reinvestment of dividends, increased to \$1,073,841. The 27 worst stock in each industry on a similar basis increased to \$693,424, "or more than enough to meet the loss of purchasing power of the dollar due to inflation."



Industrial Developments

... in the Chicago Area

INVESTMENTS in industrial plants in the Chicago area totaled \$1,185,000 in November compared with \$15,475,000 in November, 1952. Total investments for the first eleven months of 1953 stood at \$125,880,000 compared with \$193,229,000 for the same period in 1952. These figures exclude expenditures for the construction of new industrial plants, expansions of existing buildings, and acquisition of land or buildings for industrial purposes.

Kropp Forge Company, 5301 W. Roosevelt road, Cicero, will begin a multi-million dollar improvement and expansion program. A new hammer shop will be erected adjacent to the existing factory.

Magill-Weinsheimer Company, 22 South Wabash avenue, will construct a factory unit in Lincolnwood. The new factory will contain 6,000 square feet of floor area. Klefstad Engineering Company, engineer and general contractor.

Universal Oil Products Company, Des Plaines, is erecting a catalytic manufacturing plant in McCook. The new plant will be adjacent to the company's laboratory at Lawrence avenue and Route 66.

Dole Valve Company, 1923 W. Carroll avenue, is constructing a 1,000 square foot addition to its plant in Morton Grove. The company manufactures valves and thermostats. Bulley and Andrews, general contractor.

International Minerals and Chemical Corporation, 20 N. Wacker Drive, will expand its plant food division in Chicago Heights.

Wakem and McLaughlin, Inc., 55 E. Illinois street, is erecting a warehouse at 4045 W. Chicago ave-

nue. The addition will contain 110,000 square feet of floor area. A. Epstein and Sons, Inc., engineer; Poirot Construction Company, general contractor.

• **Bagcraft Corporation of America**, 4501 S. Kildare avenue, is adding 30,000 square feet of floor area to its plant. A. Epstein and Sons, Inc., engineer; Welso Construction Company, general contractor.

• **Helmco, Inc.**, 1215 W. Fullerton street, manufacturer of electric food preparation and soda fountain equipment, is constructing a 36,000 square foot factory at 7400 W. Lawrence avenue, Harwood Heights. Klefstad Engineering Company, engineer.

• **Salkover Metal Processing of Illinois, Inc.**, 4209 W. Lake street, will have a plant constructed in the Clearing Industrial District in Franklin Park. The plant will contain 28,000 square feet of floor area. Hogan and Farwell, Inc., broker.

• **General Electric Company** has purchased the plant of Templeton Kenly and Company at 1020 So. Central avenue. Templeton Kenly is building a new plant in Broadview.

• **Harrison Steel Cabinet Company**, 4718 W. Fifth avenue, is erecting office and distribution space at 1047 W. Washington boulevard. Barancik Conte and Associates, architect.

• **Harshaw Chemical Company**, 505 S. LaSalle street, is erecting a 28,000 square foot building at 4925 S. California avenue.

• **Chicago Dial Company**, 2917 S. LaSalle street, has purchased the 90,000 square foot structure at 2901

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• **Cornell Forge Company**, 6666 W. 66th street, is erecting a manufacturing building on a seven-acre site in Hampshire, Ill., Kane county.

• **Princeton Rubber Company**, a newly formed company for the production of rubber mechanical goods, has occupied its new building at 6947 W. 59th street. The plant contains approximately 23,000 square feet of floor area.

• **Williams Manufacturing Company**, 4242 W. Fillmore street, has purchased the 18,000 square foot

structure next door to its plant. The company manufactures special electrical devices. Arthur Rubloff and Company, broker.

• **Rippel Architectural Metal Inc.**, 933 S. Paulina avenue, has purchased property at Kilpatrick avenue near North avenue.

• **R. R. Street and Company**, 5 W. Monroe street, has purchased the property at 2353 S. Blue Island avenue, which contains 25,000 square feet of floor area. The company manufactures detergents for the cleaning industry. J. J. Harrington and Company and Bennett and Kahnweiler, brokers.

Man-Made Gas Field

(Continued from page 20)

by legal action, if necessary. As it turned out, relatively little court action was involved, most of the agreements being made on a friendly basis. A 72 acre tract on the surface was bought outright as a site for buildings.

The first step in construction was laying a 17 mile pipeline from the Texas-Illinois line to the reservoir area. This was done about a year ago. Then 21 injection wells were drilled. A compressor station housing five 2,000 horsepower engines was erected. An office building and a generator plant and machine shop went up. Twenty-two homes were built for employees.

The big moment came last April 1 when two 150 horsepower, portable compressors pushed the first gas into the injection wells where it moved the ancient Galesville water from the pores of a widening area. Then on July 1 the big compressors took over and injection was started on an appreciably greater scale.

Gas injection, powered by the humming compressor engines, continued into the first week of August, when the possibility that all wasn't going according to plan was raised by undue activity in some of the region's water wells.

Some gas — mostly marsh gas historically present in the upper formations — began to bubble from water wells and from two or three old abandoned oil wells on farms nearby.

The people of Herscher, who had

long since accepted the storage project as a significant addition to the community's economy, turned give whatever help they could to the company's engineering experts and outside specialist-consultants as the latter began tracing the trouble down to its source.

Many a landowner in the rural farming area turned practical geologist to give his observations and data much of which dealt with the history of almost-forgotten oil prospecting ventures, and hence was of real value to the investigators.

Meanwhile things were humming at the Chicago headquarters of the long distance pipeline companies and at The Peoples Gas Light and Coke Company. One of the business individuals was James F. Oates, chairman of Peoples Gas. Expert technicians and all manner of special equipment were placed at the disposal of the storage company's executive staff. Gas injection was halted at the storage field and adequate safety measures taken.

Then the experts started a review of all the information they had obtained about the geology of the Herscher quadrangle. They promptly came to the conclusion that, if the gas really belonged to the storage company, it must be escaping from a leak in the casing of one of the injection wells, for no suggestion of a fault could be found in the detailed studies of the dome's geology.

Meanwhile, it was becoming increasingly clear that the gas belonged to the Peoples subsidiary.

At first the escaping vapor resembled marsh gas, containing large proportions of methane, but this wasn't a certain diagnosis as the Texas gas also had nitrogen. Then ethane, found in the pipeline gas but rarely the marsh variety, appeared and the utility knew it came from the reservoir. Although they couldn't do more than guess at that point, it was surmised that gas escaping into a porous strata above the Galesville and had found its ways to the surface, pushing water, which in turn thrust the marsh gas ahead of it.

Finally, after much investigation, the leak was traced to a particular well and the problem now is believed to be solved, but the means by which this was done are worth chronicling as an example of technique with which modern science does its underground detective work.

One by one, the wells were tested. A sensitive thermometer was lowered on a cable through which passed impulses recording on a device on the surface the temperature at measured depths. What the experts hoped to find was a drop in temperature at some point, indicating a movement in the gas.

Another test used a highly sensitive spinner. If moved by gas, it generates a tiny current, recorded above ground. Still another was a microphone from which tape recordings were taken in a search for changes in the sound at different levels. Another was a cylinder covered with a canvas sleeve and about the diameter of the inside of the steel well casting. The idea behind this was that if a leak were encountered, the pressure would force the sleeve to the hole and stop its movement.

Final Confirmation

But it took a real marvel of our times to confirm and definitely fix the point of the leak at 1,100 feet in one of the wells — a level about 700 feet above the reservoir formation. This was the neutron logger, an electronic device which emits rays by which the condition of the material outside the well casing can be checked. Other testing devices had indicated that something was amiss in this same well.

When the logger told its story of a small structural flaw, the utility

plugged off the well and repaired it. Then it was cautiously reported that the trouble may have been eliminated, but that tests were continuing — in fact, they might last several months.

Meanwhile, Peoples has insisted that "Project Storage" will not be proven until the Herscher reservoir actually receives, holds, and delivers active gas. This final test, of course, has been delayed by the time consuming studies of the leak.

If the project does work out, it will be an example for the world to follow in the conservation of gas resources. It will also be an economical move for Peoples, which now has to sell at cut-rate prices in the summer gas which it could be putting into storage for the winter heating load. And it will be pleasing indeed to the people waiting for gas heating. By next May 1, the utility's home space heating customers will have increased to 140,000 from 30,000 on July 10, 1946, when the limitation order was issued by the state at Peoples' request. But the utility believes that more than 100,000 applicants still will be waiting for gas to heat their homes.

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INTERSTATE Commerce Commission Examiner Fred Christoph in his proposed report recommends that the commission find just and reasonable the demurrage charges assessed on a multiple-car order-notify shipment where the consignee refused to surrender the bill of lading until the last car in the shipment was delivered. The report is in No. 31244, Reliance Steel Products Company v. Baltimore and Ohio Railroad, involving a 13-car shipment of imported hot-rolled flat bars on which the order-notify bill of lading was issued by the defendant on April 5, 1951. Eight of the cars arrived at destination on April 10, four on April 12 and the 13th car on April 13. When the last car was delivered, the complainant surrendered the bill of lading covering the entire shipment although it had been properly advised by the defendants of all earlier arrivals and constructive placements. The complainant contended that the proximate cause of the detention of the cars was the failure of the defendant to make proper tender of delivery of all 13 of the cars covered by one bill of lading. It held that tender of delivery should have been made after the arrival of the last car and that failure to do so constituted railroad error under a tariff rule which provides in effect that demurrage would be cancelled when error of any railroad prevented proper tender or delivery. Examiner Christoph said that the detention of the cars was due to causes over which the consignee had control and that under the circumstances no relief from the applicable demurrage charges should be granted. Referring to the provisions of Section 12 of the Bills of Lading Act, he said it is clear that the defendant had a legal right to endorse on the order bill of lading each delivery of a portion of the consignment which it made and that it was the duty of the complainant to

make the order bill of lading available for that purpose.

• **Government Agencies Ordered to Submit Schedules of Fees:** Joseph M. Dodge, director of the Bureau of the Budget, has ordered all governmental agencies, including the Interstate Commerce Commission and Civil Aeronautics Board, to submit cost studies or surveys to be used in determining fees for the processing of applications for and the issuance, renewal, modification, transfer or termination of any license, permit, certificate, charter, registration, exemption, or similar form of authorization granted or otherwise provided by such agencies. The proposed schedule of fees will be announced on or before February 1, 1954, and interested parties will be given an opportunity to present comments and suggestions as to the level and form of the fees. Mr. Dodge's circular states: "It shall be the policy of Federal agencies engaged in licensing activities to provide a system of fair and equitable fees which, taking account of the value to the recipient and the public policy or interest served, shall recover, to the full extent possible, the aggregate cost incurred in the conduct of these activities." The circular was issued pursuant to Title V of the Independent Offices Appropriation Act, Public Law 137, approved by the 82nd Congress in 1951.

• **Chicago Suburban Motor Carriers' Bulwinkle Pact Approved:** The Interstate Commerce Commission has approved the Section 5a rate procedure agreement of the Chicago Suburban Motor Carriers Association, Inc. — representing some 78 motor common carriers in the Chicago area. The commission's order says that the application has been amended to conform with its earlier findings and that approval of the

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amended pact will become effective November 27, 1953. The Eastern Central Motor Carriers Association and the Central and Southern Motor Carriers Association have recently filed their Section 5a applications with the commission. Section 5a, which was added to the Interstate Commerce Act with the passage of the Reed-Bulwinkle Bill by the 80th Congress, exempts carrier rate-making procedure from prosecution under the anti-trust laws when such procedure has been approved by the Interstate Commerce Commission.

• **Report Reduction in Transportation Tax Collections:** The Treas-

ury Department's Internal Revenue Service reports that collections of the tax on the transportation of persons and property during August were below the same month in 1952. The three per cent tax on the transportation of property yielded \$25,134,000 as compared with \$31,309,000 collected in August, 1952. Collection of the 15 per cent tax on the transportation of persons produced \$24,017,000 in August as against \$26,122,000 in the same month last year. The tax on the transportation of oil by pipe lines amounted to \$1,430,000 in August, 1953, as against \$1,980,000 in August, 1952.

The Way To Look At Automation

(Continued from page 14)

quire any new management technique in evaluating the possibilities of automation. The committee simply made a methodical, commonsense attack on the problem. They made a start, and they did it.

Why, then, does one discuss new management techniques at all? The answer is very simple: education. You can attack the validity of any subject in a college curriculum, but you know that if you eliminate each of them you have no education at all! We never know which course we are ultimately going to use or which contributes to the development of our thinking processes. These techniques, inadequate as they may be, are essential background for the furtherance of good management and certainly some of them will become important, possibly sooner than we think.

I want to avoid detailed examples of automation, but there is one that has only recently been disclosed generally and it is particularly interesting. Project "Tinkertoy" of the Navy Bureau of Aeronautics was aimed at removing a bottleneck surrounding the projection of electronic devices for military uses. It can best be illustrated by studying the components that go to make up an electronic circuit comprised of resistors, capacitors, and socket plus interconnecting wires. The components are fabricated and assembled in a succession of machines. In pilot plant form these require people for little more than the transportation of components between machines.

I mention "Tinkertoy" because it

illustrates another important aspect of automation. That is the compatibility of modest experimental expenditures with the notion of automation. Too often people are frightened away because they presume that automation is a take-all or lose-all proposition, which is not true. From reading that "Tinkertoy" cost \$5 million one might assume that automation is not for him. "Tinkertoy," however, was not an idea in search of \$5 million. The initial appropriation for "Tinkertoy" was \$50,000, and the project later multiplied only as a result of wholly justified, step-by-step expansions of the program.

Again in this project, all the elements of mechanization were known. But it required a decision at the management level to launch an investigation to determine the feasibility of putting elements of these known things together in a system that would serve the overall objective of the enterprise. This topside decision is all important, for until it is made nothing happens.

We, at Honeywell, have been known to dive into things, take a look, and often drop them just as quickly. Well, there's method in this. If you don't look, you never know. And there are lots of new things popping. You can't afford to miss the one that your competitor might adopt to your disadvantage. Unquestionably there is overselling of many of these new things, but a quick look will convince you whether they show any promise for you. If the first look is promising you can go a

bit further and, thus, by steps, reach final conclusion without going overboard. This is merely education. I feel that possibly the most effective step management can take with regard to automation is to see that the industrial engineering department is provided with personnel of imagination, educated in the automation techniques available to them. You can get this in many ways from the organization's standpoint. You may have a man now heading up this activity whom you value for his ability to keep the product going out the door at the proper cost in accordance with your present situation, but you cannot expect him to initiate this new thinking. This is not an uncommon situation. In some cases you will want to make it possible for him to be versed in new techniques, or alternatively, you can find ways of injecting qualified people into his organization, or training those already there along new lines.

Academic or Practical?

Obviously whoever does it must have an open mind, a lively imagination and the proper training. He and his associates must understand what is expected of him and he must have the time to work out new ideas. What constitutes proper training depends completely upon the complexion of your organization. If it contains too high a content of theoretical or research people, you have an unusual situation and one you can rather quickly balance with some practical, but broadminded, shop people. Most organizations are in the position of having too little of the academic type of person. This type of person has trouble settling into the factory atmosphere permanently. Once his associates recognize his capacity to make a contribution, however, and he recognizes the practical limitations on his theories, he can be extremely effective. I would caution against underestimating the intricacies of the problem but, at the same time, can promise that the rewards are well worth the effort.

Summarizing, it would appear that the upsurge of new and important techniques of analysis, control and of manufacture promise fantastic rewards to those who can employ them. In exploiting these things, managers must ignore the details of the mechanical and electrical wonders of

carrying out the automatic factory. They must start automation by forgetting all about mechanisms or means. They must ignore, too, the details of the analytical or planning techniques used in conjunction with them.

Managers should select, as a beginning, techniques that superficially seem to have the most applicability in their businesses and concentrate on the group where the cost reduction possibilities appear to have the most promise. They must set up deliberate and forceful educational campaigns among their people in the

appropriate techniques and equipment. Academic folks are willing and able to help here and so are the consultants and equipment manufacturers.

American industry has been and will continue to be strong in the execution of such plans. It seems, however, that we would improve the feedback or checking step to measure the results of the execution of our plans and correct the inevitable errors in them. Thus, we can get back the control of the destiny of the automatic factory from the science fiction writers.



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Ceramic Magnet

A completely new type of magnet, composed of ceramic material lighter than metal and requiring no critical materials, is scheduled for commercial production before the year's end by Indiana Steel Products Company of Valparaiso, Ind. Called Indox, it is the first new magnetic substance developed since 1931. According to the company, Indox has twice as much coercive force as Alnico, the metallic permanent magnet in common use today, and is a non-conductor. Indox is recommended for uses in which application limits magnetic lengths and in which the magnet may be subjected to high demagnetizing forces. It is made from iron oxide and barium carbonate. Initial production will be for television focus rings, novelties, toys and holding devices.

Anti-Sleep Pill

Designed to pep up sleepy motorists and particularly the long-haul driver is Driv-A-Lert, a coffee-flavored caffeine lozenge developed and placed on the market by Edison Chemical Company, 30 W. Washington St., Chicago. The manufacturer says it is neither a depressant nor habit forming and suggests that you can take it as often as you would a cup of coffee. It is just under an inch in diameter and has a malted milk base. Its stimulating effect is said to be almost instantaneous. (Editor's Note: You might also take some along when a boring evening is in prospect, and bosses might try to popularize its use as a quickie substitute for the office "coffee-break.")

Powerful Transistor

A power-type transistor, 100 times as powerful as present commercially available types, has been developed by the Minneapolis-Honeywell Regulator Company of Minneapolis. The new unit is about the size of a thimble. Its 20-watt power enables it to do things heretofore impossible with transistors such as the operation of motors, valves, relays and

other equipment. Honeywell, who expects to use it in the field of automatic controls, has not yet put it in commercial production.

For Discouraged Golfers

Federal Products Company of 6 Grove St., Evanston, Ill., offers \$2.95 fresh hope for golfers who are prone to miss short putts. It is Strooscope, an aluminum attachment with a round plastic inlay that becomes the striking area of the putter. The makers say that the "gun-sight" nature of the device reduces the scope of vision to such an extent that correct contact with the ball is a certainty. With Strooscope comes special cement for the golfer's use in attaching it.

Plastic Truck Doors

Strong, weight-saving plastic doors that will not freeze closed have been developed for insulated trucks. The new-type doors are made from Fiberglas and Vibrin, a polyester resin produced by Naugatuck Chemical division of United States Rubber Company. The doors are molded in a single pan-like section that is filled with insulation and then faced with a sheet of aluminum. The finished door with hardware and aluminum facing weighs only 75 pounds. Low water absorption permits the door and frame to be molded with only 1/16 inch clearance, less than half the usual clearance for insulated doors. Makers are Americana Enterprises of Stamford, Conn.

Tiny Flashbulb

A flashbulb the size of the smallest Christmas tree bulb has been introduced by the General Electric Company. Known as the M-2, the new bulb is now in production and will be generally available on the retail market next spring. Compared with the standard No. 5 bulb, the M-2 has the same effectiveness at half the distance. A pack of four M-2 bulbs will be the length and thickness of a package of king-size cigarettes, but will be only three-quarters as wide.

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Burying the Hatchet by Piggy-Back?

(Continued from page 17)

tially six times as profitable as conventional less-than-carload service. In addition, Mr. Dezendorf said, the new car, by making "piggy-back" service more profitable, would enable the railroads to establish rates low enough (rates lower than truckers' presentday costs of hauling trailers over the highways) to attract available truck business in volume.

One Chicago firm, the Rail-Trailer Company, has already announced its intention to purchase the new Electro-Motive flat car for lease to the railroads. Eugene F. Ryan, president of the firm, reports that a subsidiary, Van-Car Corporation, will handle the actual flat car and trailer leasing operations. In making the announcement, Mr. Ryan said an analysis of the revenue-producing potential of rail-trailer movement, compared with conventional less-carload movement, based on 50-car trains running between Chicago and New York City, showed that the railroads could make a net revenue of \$12,327 on the rail-trailer train,

compared with a net revenue of \$3,769 for the less-carload train. The gain would come about mostly through the elimination of high terminal costs at both cities, he said.

Another railroad equipment manufacturer, the Pullman-Standard Car Manufacturing Company, is working on a new type flat car, featuring a cushion underframe and special hold-down devices, which would also be 75 feet long and would accommodate two standard cross-country trailers or three short trailers. In operation, two loaded trailers would be backed from a dock on to the Pullman-Standard flat car spotted on a depressed track.

There are two ways in which the railroads can undertake to handle loaded highway trailers, according to a special committee of the American Association of Railroad Superintendents. The first of these would be under a "substituted service contract," which would be entered into only with a properly licensed and authorized common carrier truck

line operating between the points concerned. Under such a contract the arrangement existing between each truck company and the railroad would be an entirely private affair and would not have to be disclosed. The railroad would be able lawfully to enter into different contracts with different truckers which might vary both as to charge and to conditions and agreements. The second method would be for the railroad to publish a tariff for the movement of loaded trailers, in which case, service could then be used by contract and private truckers, or anyone else having a loaded trailer he wished to have transported.

Who would benefit from the new service? The railroads would benefit in that they would:

1. Share in some of the traffic now going by truck. In this respect, it is pointed out that in the last five years, railroad intercity freight traffic has increased only an average of 3.6 per cent annually, while truck intercity traffic has gained an average of 62.5 per cent a year.

2. Achieve lower handling cost on less-carload shipments.

3. Reduce terminal costs, and delays, and eliminate damage claims because of less handling.

4. Provide improved service to off-rail patrons.

5. Provide faster and better service over-all, thus attracting more business, improving their revenue and net income position.

Major disadvantage listed by railroad opponents to the plan is the possible disruption of established tariff schedules and customer relationships. Establishing a rate schedule for the new service would pose considerable problems, not the least of which would be determining a satisfactory rate for the railroad freight forwarders, which present would solicit less-than-carload shipments, consolidate them into carload lots and ship them at the carload rates over the railroads.

The truckers would benefit from "piggy-back" in that they would:

1. Provide better and faster service between distant points at less cost than they can provide such service today, thus improving their profit position.

2. Have less wear and tear on costly over-the-road equipment.

3. Cut equipment, labor, insurance and other costs.

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4. Improve their standing with the public by putting fewer trucks on the highways.

5. Have a good talking point against higher license fees, ton-mile taxes, state size and weight barriers, and other penalties imposed by states seeking to make them bear a greater share of the cost of building and maintaining the highways.

The public would benefit in that:

1. Shippers would get better, and faster service.

2. The cost of transporting less-than-carload freight would ultimately be reduced because of the elimination of present duplicating rail and truck facilities.

3. With an improved financial position, the railroads should be able to provide better passenger facilities.

4. Congestion on the highways could be greatly reduced.

5. The cost of building and maintaining highways would be lowered.

6. With lower highway costs, the public could demand lower taxes.

New Haven Operation

Now, let's take a look at some of the nation's "piggy-back" railroads. The New York, New Haven and Hartford, probably the leading operator of trailer-on-flat car railroad service at present, began such operations in 1937, determined to make the service a success by maintaining proper schedules. Overnight service was instituted between New York City, New Haven, Conn., Springfield, Mass., Providence, R. I., and Boston, Mass. The objective was primarily to recover in some measure the traffic lost to competing highway carriers, and to transport its own less-carload freight more expeditiously and more efficiently. Was the New Haven's operation a success? Well, last year, in the fifteenth year of "piggy-back," the railroad hauled a total of 34,000 truck-trailers, adding \$1,300,000 to its gross revenue, of which an appreciable amount was profit.

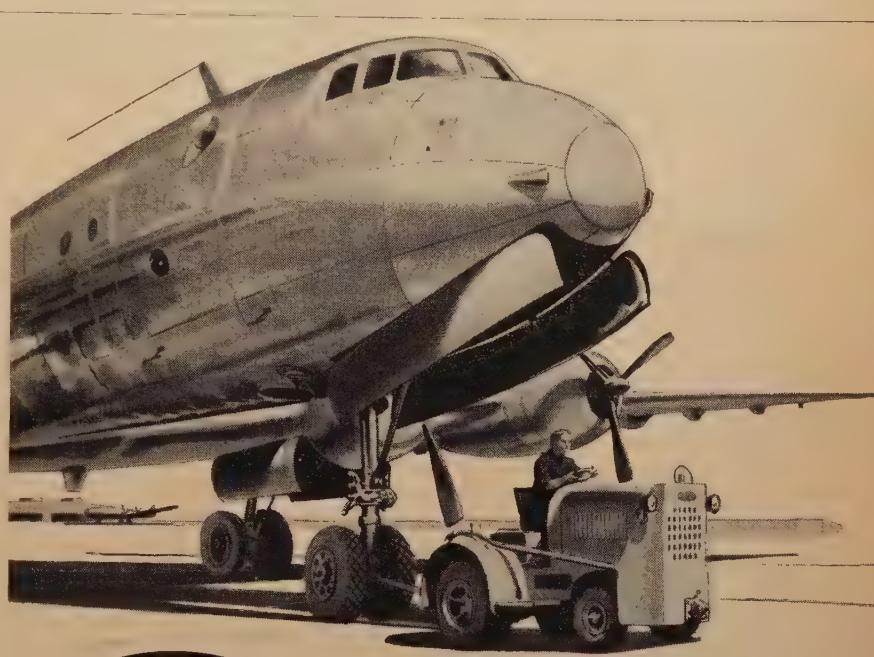
Other railroads which have had "piggy-back" operations at some time or other, are the Rock Island lines, which, between 1938 and '42, carried trailers for Keeshin Truck Lines between Chicago and the "Tri-Cities;" the Wabash Railroad, which had the service for a short time in 1934; the Burlington Railroad, which instituted such service for its own truck subsidiary, the Burlington Transportation Com-

pany, between Chicago and Galesburg, Ill., in 1937, a service which is still in operation; the Chicago and Eastern Illinois Railroad, which established the service in 1949 between Chicago and St. Louis, Mo.; the Santa Fe Railway which inaugurated the service in 1951 for its own motor vehicles between Kansas City and Wichita, Kans., and the Detroit and Mackinac Railroad, which started the service in 1951 for its own less-carload traffic.

The Southern Pacific Railroad began large-scale trailer-on-flat car

operations just this year. The service fans out from Houston, Tex., to various points in southeast Texas and southwest Louisiana. According to K. P. Chinn, S. P. assistant vice-president at Houston, the new service is the first of its kind south of St. Louis, and provides expedited service that eliminates costly and time-consuming yard and terminal operations.

The S. P. also instituted a test trailer-on-flat car service recently between San Francisco and Los Angeles, Calif., each night running four



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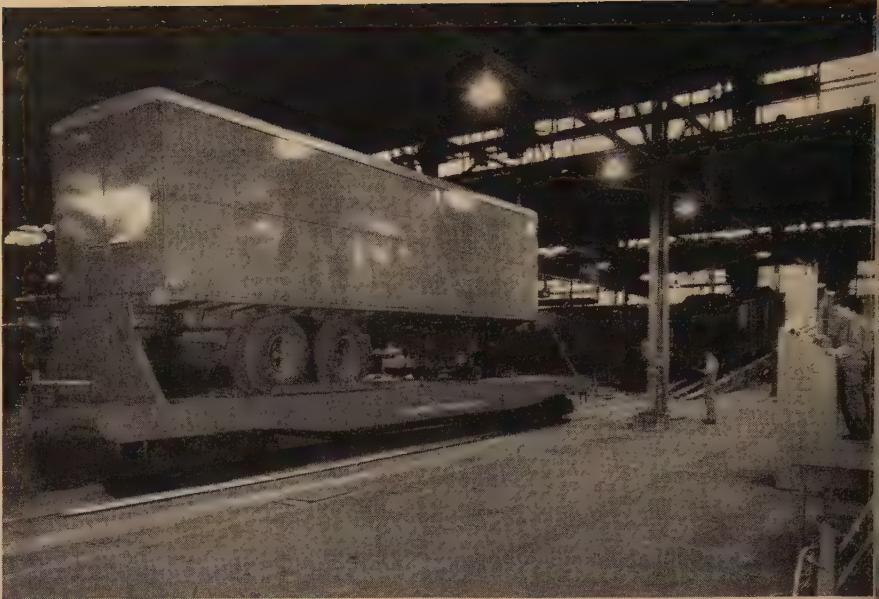
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trailers southbound and four northbound on special flat cars.

The Chicago and North Western Railway System inaugurated tests of "piggy-back" service August 13, running two flat cars, carrying a total of four trailers containing a total of 40,000 pounds of less-carload freight, overnight from Green Bay, Wis., to Chicago. The service involves the use of four such flat cars, carrying a total of eight trailers, two running north, and two south, each day. According to J. E. Goodwin, vice-president in charge of operations, the service "eliminates handling at Chicago and Green Bay," resulting in savings of time and effort, "and serves as a guide to expansion of this type of service to various parts of the North Western system."

What does labor — especially the International Brotherhood of Teamsters, whose over-the-road drivers would be most affected by large-scale "piggy-back" operations — think of all this?

The teamsters, as far as is known, have not yet taken any official position on "piggy-back" service. David Beck, the union's president, is scheduled to name a special fact finding committee "to study the impact of the plan on capital investment of truckers and job opportunities of Teamster Union members." Mr. Beck is also chairman of the Independent Advisory Committee to the Trucking Industry, a group already studying the "piggy-back" plan. It has been reported, although not officially, that Mr. Beck is cool to the "piggy-back" idea.

The Brotherhood of Railroad Trainmen, however, has proposed the formation of a national committee "to promote the shipment of highway trailers by rail flat cars ... on all railroads throughout the country." Brotherhood President W. P. Kennedy made the proposal in a talk before the Brotherhood of Locomotive Firemen and Enginemen at its annual convention this year. After charging that railroad management had been "dragging its heels so far as progress in railroad transportation is concerned," Mr. Kennedy predicted a bright future for the industry if it would "seize the one big opportunity that now confronts them."

As regards the view of railroad management with respect to trailer-on-flat car service, listen to the statement of one of the nation's leading railroad officials — J. Newell, vice-president, operation of the Pennsylvania Railroad.

In discussing "piggy-back" in Chicago recently, Mr. Newell said that it was his personal belief that trailer-on-flat car service would "ultimately prove to be the solution to many of the ills and problems which are confronting the transportation industry and the traveling public. Such problems as over-crowded highways and highway deterioration would be solved, Mr. Newell said, "if and when the long-haul highway trailers can be moved economically on flat cars, with resultant profit to both the railroads and the truckers and without disturbing our present structure . . ."

Here, There and Everywhere

(Continued from page 8)

bulky x-ray equipment for inspection work. "To make an x-ray of an airplane wing, you could put the radiation source right inside the wing and place film around the outside," he says. "When you developed the film you would have an x-ray picture of the wing structure." Medicinally, he regards his device as a supplement to radium and radon, a gas derived from radium, in treating cancer. It is fairly inexpensive and can be designed to remain active for as long as several years, he says.

Chemical Traffic—Chemical traffic on the inland waterways has been rising 20 per cent a year since 1949 and, according to the American Waterways Operators, Inc., the 1953 volume is expected to exceed seven million tons. Principal items moving on inland waterways are sulphuric acid, sulphur and other industrial chemicals, phosphate fertilizer materials and other fertilizers, coal-tar products and chemical specialties.

Industry vs. H-Bomb

(Continued from page 15)

physical devastation to the U.S. production machine; (2) our survival depends on industry's ability to come back after attack; and (3) we still have time to make plans and we should use it.

ODM, in asking the Commerce Department's industry advisory committees to plan post attack production measures, has grouped them under three headings: preventive, supply, and reconstruction. Although industrial dispersion heads the list under preventive measures, ODM notes that "existing geographic concentration of essential production cannot readily be overcome in a short time in the absence of the pressure or urgency of a war." However, it adds, it may be possible to deconcentrate essential production by such means as revising product or performance specifications, where feasible, to permit additional facilities to participate and thus spread the production geographically. Also, it suggests that protective construction can be important as a

preventive measure for American industry.

Dispersion is the basic approach of tentative plans evolved by the rubber industry for recovering from an attack. On the assumption that airplane tires would be the industry's highest priority under such circumstances, the rubber industry committee worked out plans to transfer production of this item to a number of other cities from Akron and Detroit, where 85 per cent of it is now concentrated. The plans, devised to allow a certain flexibility depending on the amount of damage

to existing capacity in the two target cities, look to making up 95 per cent of the loss within 30 days of the attack.

Details of the plan are secret, partly for reasons of national security, partly for reasons of business competition. Means of implementation are far from complete. However, dispersion has one great argument to recommend it: it is not subject to obsolescence. Radar screens, jet fighters, and other defensive weapons obsolesce as fast as the weapons devised to cripple in-

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dustry, but dispersal of the target remains a constant factor.

Farthest advanced, and one illustrating the kind of steps that can be taken besides geographic dispersal, is the jeweled watch movement industry. Four companies produce the total U. S.-made jeweled watch and clock movements on the market.

Why are jeweled watch movements necessary to defense? Partly because they are used in marine chronometers and aircraft clocks, to mention two of the instruments needed by the armed forces. But a more compelling reason is that to produce innumerable small timing devices for fuses, aircraft instruments, radar, articles calling for minuscule jeweled pinions and microscopic threads and springs of steel two-thirds the thickness of a human hair, you go to the industry which makes these tiny objects to earn its bread and butter. The subcontracts on which the watch companies are engaged reveal the story. They are making these objects with tolerances in the ten thousandths of an inch, and producing them by the millions.

The companies involved are Elgin, of Elgin, Ill. and Lincoln, Neb.; Waltham, of Waltham, Mass., a suburb of Boston; Hamilton, of Lancaster, Pa., and Bulova, with a factory in Woodside, L. I., and other locations in the New York metropolitan area.

Three of these — all but Elgin — are in "prime target areas," and Elgin is a little too close for comfort.

Job Divided

With this in mind, the industry divided up the study job. Bulova came up with recommendations for minimizing and preventing damage and for protecting against fire, atomic radiation, and shock wave damage. The industry uses two kinds of machines: machine tools and production machines. While certain kinds of construction to protect some machines from bomb damage was considered feasible, it was pointed out that even a near miss might so jar a production machine geared to the fine tolerances used in watchmaking that it would be ruined if started. This suggested that adequate protection for such machines would be ruinously expensive.

Elgin studied the feasibility of stockpiling long lead time tool ma-

hines. It also explored the possibilities of subcontracting outside the industry and established that this was no solution since it could make up only five per cent of production.

Hamilton reported on duplication of production records, blue prints, etc., and made suggestions for microfilming them and storing them safely. Certain glass plates used for enlargement to check the accuracy of tolerances, it was found, could not be reduced to microfilm and re-enlarged without distortion, and special provision was made for them.

Waltham studied the problems of personnel: protection of the workers at the plant, feeding them, giving first aid.

Results

This four-part attack on the problem showed the industry that with lead time on its tools from six to 24 months and lead time on its workers running as high as 12 years (the industry's 125 to 130 horological manufacturers have been through 10 years' training in addition to 4,000 hours as mechanics), even aside from the human consideration, the workers were more valuable than the machines if the industry was to be kept going; it was not an industry that would lend itself to quick expansion even if tools were available.

The result has been that the industry has made arrangements to tie into the attack warning system so as to get the word within seconds, literally, of the flash of danger. It has worked out a system of procedures for doing everything possible to protect its workers at the plant and to protect its machines. It has organized internally for security, watching for possible sabotage and training for coping with disaster. The latter involves such detail as making sure which employee knows his job after attack is to become an emergency cook, and which knows his job to decide whether a machine has been hopelessly damaged and can be cannibalized to repair others, or whether it can be repaired itself.

The longer range part of the problem is unresolved. The industry does not know what further steps it should take, or what it should ask the government to undertake because its cost is beyond the industry's capacity to finance. The steps it has initiated are steps which can be

borne by the companies involved—steps, in fact, which any prudent manufacturer would want to take as a sort of insurance, within his means, of the threat posed by Soviet possession of the H-bomb.

The industry is thinking that perhaps certain basic types of its equipment should be put away as a reserve stockpile. It believes that one of its units needs better provision for the protection of its workers. On such points nothing has been put in writing.

There are about 100 industries which, in ODM opinion, need to undertake similar studies. Some of them, like the manufacturers of components, have problems so similar that they can be grouped in one plan. But the government thinks it is not too early to begin working out a home front defense against the bomb which balances the factors of protection against cost and comes out with an answer that insures the recovery ability of American industry.

January, 1954, Tax Calendar

(Continued from page 2)

31 Federal Unemployment Compensation Tax for 1953. This tax amounts to .3 of 1% of the 1953 taxable payroll. Tax may be paid quarterly. (Form 940). Wage base \$3,000.

31 Federal Old Age Benefit Tax for last quarter of 1953, return and payment (On first \$3,600) (Form 941)

31 Federal Excise Tax return and payment due for December, 1953

31 Employers who withheld more than \$100 of income and Social Security taxes during previous month pay amount withheld to or remittance may be made with quarterly return directly to

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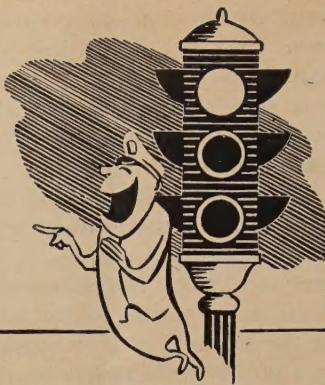
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Young actor: "I've got a job at last, Dad. It's a new play, and I play the part of a man who has been married for 20 years."

Father: "Splendid. That's a start, anyway, my boy. Maybe, one of these days, if you're lucky, they'll give you a speaking part."

A department store floorwalker thoroughly fed up with his job, quit and joined the police force. When asked why, he explained, "The pay and hours may not be so good, but at least the customer is always wrong."

A three-year-old boy cried bitterly as a large friendly dog bounded up to him and licked his hands and face. "What is it?" asked his mother. "Did he bite you?"

"No," came the cry. "But he tasted me."

A visiting Texan was telling his Minnesota host about the big fish he had caught in the Lone Star state. "As a matter of fact," said the Texan, "I caught one that was eight inches."

Our Minnesota friend told the Texan that a fish that size was small in his state.

"Mebbe so," said Tex, "but down there we measure a fish between the eyes."

A youth applied for a job at a drug-store. His interviewer began to fill in the form.

"Your name?"

"Thomas Edison," answered the boy.

"That's a pretty well-known name, isn't it?"

"It ought to be," said the boy. "I've been delivering groceries around this neighborhood for two years."

It was so tough for Joe to get up mornings that he went to his doctor who prescribed a pill. Joe took the pill, slept well and was awake before he heard the alarm clock. He dressed and ate breakfast leisurely. Later he strolled into the office and told the boss:

"I didn't have a bit of trouble getting up this morning."

"That's good," replied the boss, "but where you yesterday?"

"How is your wife getting along with her reducing diet?"

"Perfect. She disappeared completely last week."

The judge was remonstrating with Washington T. Lincoln over an arrearage in his alimony payments. "Well, jedge," said Washington, "reckon ah is behind on my payments . . . but you see, jedge, mah ne wife ain't turned out to be de worker who thot she was gwine to be."

Hard-boiled sales manager: "Show me a single order that advertising ever put in our books."

Alert salesman: "I will just as soon you show me one load of hay that was ever put in the barn by the sun."

"Don't you hate being a bill collector? It must be awful to be unwelcome wherever you go."

"Oh, no. Almost everyone asks me to again."

Sylvia: "When I applied for a job the manager had the nerve to ask if my punctuation was good."

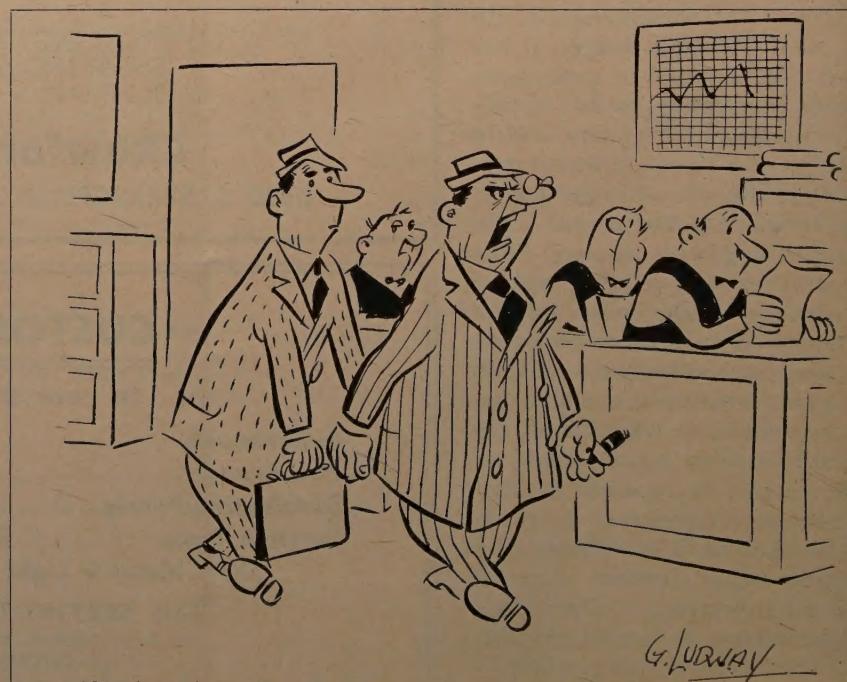
Mildred: "What did you tell him?"

Sylvia: "I said I'd never been late for work in my life."

The maid had been surreptitiously using the bath tub of her employer, an elderly bishop. He was a bachelor, very fastidious about his toilet, and desired the exclusive use of his tub.

He reprimanded the maid with much indignation:

"What distressed me most, Mary, is that you have done this behind my back."



"Now at this meeting, Burke, my subject is going to be 'A Smart Executive Hires Smart Assistants,' so don't open your mouth."

G. LUDWIG